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Contents.

	PAGE
Forthcoming Events	411
The Birmingham and Coventry Convention	411
The Inferiority Complex—II	411
Correspondence	412
The Purchasing Agent	412
Reports and Dividends	412
Random Shots	412
The Laboratory and the Foundry	413
Preventing Uneven Chill in Chilled Moulds	414
Birmingham Convention Fund	414
Institute of British Foundrymen: Twenty-Eighth Annual Convention at Birmingham	415
Twenty-One Years' Sterling Work Recognised	423
Trade Talk	425
Company News	425
Contracts Open	425
New Companies	425
Personal	425
Anglo-Russian Trade	425
Iron and Steel Markets	426

THE FOUNDRY TRADE JOURNAL IS THE OFFICIAL ORGAN OF THE INSTITUTE OF BRITISH FOUNDRYMEN; THE WELSH ENGINEERS' AND FOUNDERS' ASSOCIATION, AND THE FOUNDRY TRADES' EQUIPMENT AND SUPPLIES ASSOCIATION.

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Forthcoming Events.

JUNE 24.

Staffordshire Iron and Steel Institute:—Visit to the National Physical Laboratory, Teddington, Middlesex.

JUNE 29-JULY 4.

History of Science and Technology:—Second International Congress, in London.

JULY 13-18.

British Chemical Plant Exhibition:—Central Hall, Westminster.

JULY 13-19.

Society of Chemical Industry:—Jubilee meeting in London.

Institute of British Foundrymen.

JULY 11.

Lancashire Branch:—Branch picnic and visit to Grin Quarries of the Clay Cross Company.

The Birmingham and Coventry Convention.

With the exception of international congresses held in London, we believe that this was easily the largest provincial manifestation of foundry endeavour ever held. Its organisation was brilliant, its balance perfect and its cardinal objectives successful. The organising committee were fortunate in having the whole-hearted co-operation of the civic, university and organised scientific authorities, and to them the foundry industry is deeply indebted. The only feature which did not come up to expectations was the character of certain of the foreign exchange Papers, which scarcely did justice to the calibre and standing of the associations on whose behalf they were presented. The works visits were more than usually interesting, for, after all, it must be conceded that the Midlands are in the forefront of foundry development.

The choice of Mr. Harley as President was a particularly happy one, as the main result will be a better understanding between the automobile trade and the foundry industry. We attach so much importance to this, that we consider that the Institute would be wise, when choosing its Presidents in the future, to elect prominent individuals capable of making lasting contacts with such allied industries as the electrical, textile, shipbuilding, agriculture and so forth.

It has been our privilege to attend about 25 foundry conventions, national and international, but we never remember one working so smoothly and to the general satisfaction of everyone concerned as the one just terminated. The Institute is indeed greatly indebted to its President, Mr. F. K. Neath, Mr. F. H. Hurren, Mr. D. H. Wood and Mr. F. J. Hemming, and to the directors of those enlightened concerns which threw open their doors for inspection.

A departure was made, this year, in the shape of a new type of Paper. Two were presented of a non-technical character. One, by Mr. L. H. Pomeroy, told of what the engineer expects from the foundry, and the second, by Mr. Eric N. Simons, how to dispose of its products, both being essentials to the welfare of the industry. By doing this, the Institute is following the lead of the American and German foundry associations and departing from that established by its British sister societies. However, it is not the first time that the Institute's innovations have formed a lead for the older national scientific associations, and this may act as a pointer to help them to give more service to their members.

The Inferiority Complex—II.

We referred in our last issue to the evidence accumulating to the effect that, under conditions of high-temperature working, cast metals behave relatively better than the wrought metals. The gradual extension of a metal at high temperatures under loads which, in the cold state, would be quite insufficient to produce any measurable extension at all, is now known by the picturesque but effective name of "creep." The American exchange Paper by Mr. Spring, read last week at the Birmingham Convention, says: "It seems to be quite well proved that a cast structure will resist without deformation a somewhat higher temperature at the same load, or, what is practically the same thing, a higher load at the same temperature, than the same material in the forged or rolled condition."

The explanation of this phenomenon is rather obscure at present, but that it is a fact should be encouraging to the foundry trade. The invariably larger grain size of castings does not seem sufficient to explain it.

The author of the above Paper goes out of his way to state that it is not intended as a eulogy of steel castings, and he has no interest in praising them; this alone is indicative of the favourable position they occupy under high-temperature tests.

Several other points of superiority were mentioned, particularly that castings are preferred by users in the States to forgings because they last somewhat longer under corrosive conditions.

Those who have read the Paper delivered by Mr. L. H. Pomeroy to the Convention will note here again a user who has no special interest in preferring castings of any kind to wrought materials, except for their intrinsic merit, giving several reasons for preferring cast material. The product of the foundry is coming more and more into its own, and all this stresses more than ever the importance of the industry carrying on its own research work for the purpose of demonstrating the properties of the product for special purposes. The result of these investigations is bound to be an increased engineering demand and pressure from the user to improve properties of the casting to the highest degree consistent with it retaining those properties which make it valuable from the "creep" standpoint.

XUM

Correspondence.

[We accept no responsibility for the statements made or the opinions expressed by our correspondents.]

Elasticity and Plasticity.

To the Editor of The Foundry Trade Journal.

Sir,—Is it possible that failure to be precise about the two entirely distinct phenomena—elasticity and plasticity—is responsible for the alleged inferiority complex to which you refer in your second leader of June 11, 1931? Has Professor Hanson written "elasticity" when he intended "plasticity" on page 388, third column, line 60, of your issue of June 4, 1931?

The user of, for example, tubes in a high-temperature furnace needs a material, not only sufficiently tough and resistant to withstand the working conditions when the plant is on steam, but one which will not be excessively brittle, either at high temperatures or after cooling, when the tubes may have to be dismantled for cleaning or the replacement of corroded parts.

It is recognised that some wrought materials prove exceedingly brittle after prolonged soaking in a furnace, and that cast material may show an advantage in this respect. With a ductile material, the yield point can be exceeded and local concentrations of stress can adjust themselves without permanent injury in every case. With brittle materials permanent injury is inevitable.

The foregoing statement is liable to refutation because there exist no universally recognised definitions of elasticity, plasticity and yield point. The confusion over the meaning of elasticity is striking. Some hundreds of years ago Robert Hooke, it is reported, wrote that in an elastic material stress is proportional to strain. This is quite properly the sheet-anchor of engineering design. But why accept it for research work? It is not true for cast iron, as may be clearly seen by examining stress-strain diagrams in which the plastic has been separated from the elastic property (see for example Fig. 4, page 503, "Die Giesserei," No. 22, May 31, 1929; or plot the elastic stress-strain results for cast iron given in "Experiments on the Strain in the Outer Layers of Cast Iron and Steel Beams," E. C. de Segundo. Min. Proc. Inst. Civil Engineers, Vol. 98, 1888-89).

The suggestion that Hooke's law conceals the real truth about elasticity, and the further suggestion that the mathematical theory of elasticity, which is built on Hooke's law, is a stumbling block to the development of a rational stress theory applicable to cast iron, will be no more acceptable to mathematicians than was the assertion long ago that the sun, and not the earth, is the centre of our particular universe.

Plasticity is clearly the antithesis of elasticity, since an elastic material is one in which stress is some function of strain (not necessarily a linear function), whereas although a plastic material will also deform under applied stress, it will not return to its original shape when the applied stress is removed, as an elastic material does.

Yield point is incapable of clear definition while elasticity and plasticity are confused. Ordinary mild steel at room temperature will yield slightly at very low stresses. But up to a certain stress the plastic yield can mostly be removed temporarily to enable the elastic properties to be studied. At this limiting stress, however, there is a large plastic yield, so great as to render the initial elastic property negligible by comparison (see "The Mechanical Properties of Steel," Prof. W. E. Dalby, Min. Proc. I.C.E., Vol. 221, 1925-26). In the case of cast iron the large plastic yield is non-existent, and sudden fracture takes its place.

The writer is not aware whether any experimenters have yet attempted to study the elastic properties (separated from the plastic properties) of cast material at elevated temperatures. In a considerable amount of the data of creep tests available, there does not appear to be a clear differentiation between elasticity and plasticity.—Yours, etc.

A. C. Vivian, Asso.M.Inst.C.E.

Britannic House,
Finsbury Circus,
London, E.C.2.
June 13, 1931.

The Purchasing Agent.

Mr. E. J. Fox, managing director of the Stanton Ironworks Company, Limited, and Past-President of the National Federation of Iron and Steel Manufacturers, in the course of an address at the Industrial Purchasing Conference, organised by the Industrial Welfare Society, said that the functions of a purchasing agent were such that he could not acquire too wide a knowledge of the products he might be called upon to buy, and it should be the first principle to have a man whose business it was to get to know everything his suppliers could tell him about their goods, and above all, to make a point, either directly, or through his responsible assistants, of seeing every caller who took the trouble of paying a visit.

An efficient purchasing agent required to make himself as popular to those with whom he was dealing as it is universally accepted a salesman must be; and a popular and courteous purchaser would acquire a good deal more information and knowledge from the seller than would the individual who was small-minded enough to overlook the fact that he was temporarily placed in the privileged position of buyer.

It was unworthy of a company of importance, and certainly bad business (Mr. Fox continued), to allow representatives to wait about the corridors of an office; nor was it desirable to send a junior to convey the information "We are not interested." If a man had taken trouble to come and see anyone, the least one could do was to provide some responsible official who could intelligently listen to what he had to say. It was better to interview half-a-dozen representatives without result than to miss one whose business might prove to be important.

Reports and Dividends.

Mirrlees, Bickerton & Day, Limited.—No dividend on the ordinary shares for the year ended March 31.

Butterley Company, Limited.—Final dividend of 4 per cent., making 5 per cent., tax free, for the year.

Armstrong Whitworth Securities Company, Limited.—Net profit, £56,959; brought in, £11,715; carried forward, £68,674. No dividends are declared.

Ruston & Hornsby, Limited.—Loss for year, £34,703; brought in, £38,195; transferred from reserve, £50,000; debenture interest, £25,168; carried forward, £25,919.

William Cooke & Company, Limited.—Net profit of £2,791, reducing the debit balance brought in to £31,629, which, the directors state, will be dealt with by a capital-reduction scheme.

Burntisland Shipbuilding Company, Limited.—Net profit, £15,408; brought in, £4,687; final dividend of 2 per cent., making 4 per cent.; to taxation reserve, £1,867; depreciation, £3,600; carried forward, £9,978.

Consett Iron Company, Limited.—Profit, £286,466; debenture interest, £150,000; undivided profit brought in, £101,266; carried forward, £237,732. No dividend on the preference or ordinary shares is recommended.

Callender's Cable & Construction Company, Limited.—Profit, £320,036; brought in, £428,528; available, £748,564; depreciation, £50,000; debenture interest, £13,500; pension fund, £10,000; preference dividends, £56,000; ordinary dividend of 15 per cent., £167,400; renewals account, £100,000; carried forward, £351,664.

Random Shots.

How could the Birmingham and Coventry Convention have been anything but a success when its very name smacked of foundry art?

* * *

A principal official of a national body can count himself fortunate when either the incoming or outgoing President is a Scotsman, or, failing a Scotsman, a Yorkshireman, because it is then tolerably certain that one or another of a thousand and one stories will prove appropriate to the occasion. Mr. Wilson's yarn of the Scottish raids into England was so appropriate that the Editor has allowed it to stand in the official report, thus robbing "Marksman" of a story that he had earmarked for himself.

* * *

Mr. Harley's retort, however, has been spared to me. He told of how a Yorkshireman, who had been approached to join an Anti-Tipping League, listened with greatest enthusiasm while its aims and objects were expounded in broad Scotch. But, learning that the annual subscription was a shilling, he turned away in disgust. The League's cure was worse than the disease!

* * *

If I were asked to make an award for powers of oratory within the Institute, I fancy that the laurels would go to Coventry, for what town can produce a trio to vie with the President, Councillor Roberts and Mr. Carey Hill? Citizens of Coventry might have considered the historic past of their city somewhat slighted if Lady Godiva had been allowed to pass without comment (as a subject, I mean). Nevertheless, Mr. Roberts's assertion that to include in the town's forthcoming hospital-festival procession, as a memento of Godiva's connection with the city, a lady riding a bicycle without a tyre would pass unnoticed, is indisputably correct.

* * *

Mr. Harley may think he knows a thing or two about the art and science of "passing the baby," but for its actual practice commend me to Mr. Neath, a joint secretary and honorary treasurer of the Convention. He was very careful to explain that the entire work of organising the Convention was in the laps of the ladies on the Research Association's staff. As they could not find a more suitable spot for "parking the baby" (and really I cannot think there was one), for a spell they ranked, not unwillingly, amongst the world's doers.

* * *

Who would have thought that the duties of scrutineer in a postal ballot were anything other than dull and laborious? Yet during the past week the heroes deputed to perform this seemingly unexciting task were rewarded by finds of cheques, postal orders and stamps. Postal ballots for the offices as scrutineers are now being suggested.

* * *

Imaginary Intimate Interviews.

VII.—*Any Conference Secretary.*

Hard work to organise a conference? I should just say it is! One has committee meetings each Friday, with informal luncheons and dinners as interludes. Oh, yes, the President's privilege is to pay—why else would he be included? Then there are letters to write—lots and lots of them. Of course, the promise of a dinner and a dance or two during the conference squares the typists, although for a married man with two baby girls . . . Then the headquarters look after the official side of the business while my very able colleague is engaged behind the scenes of the actual venue. And a ladies' committee naturally sees to the welfare of their kind. Co-ordination, my boy! Organising conferences is the type of job that trains a man for chairmanship of battleship trust companies! In fact, just the job that a conference president described last week—"Passing the baby," you know. Marksman.

The Laboratory and the Foundry.*

By R. Arzens.

[FRENCH EXCHANGE PAPER.]

[A number of the duties of the foundry metallurgist are indicated, and stress is laid upon the value of his co-operation with the practical executives.]

There is no question to-day as to whether or not the laboratory is a necessity. Many foundries have already realised the increased profits rendered possible by the inclusion of a well-equipped laboratory in their organisations. The question is rather how this valuable section of the organisation can be used to produce the maximum of these profits and prove an efficient aid to the foundryman. The object of the present Paper is to answer this question.

The Chemist is more Necessary To-day than Yesterday

Efficiency methods, progress in moulding and in metallurgy, and the demand for more and more special and high-quality products have so complicated foundry practice, compared with what it used to be, that, except in the case of a very small foundry, it is a practical impossibility for a foundry executive to occupy himself with all the details without neglecting some of them.

So much progress has been made in moulding and core making alone that, in a medium-sized foundry, these two important items occupy all the time of the foundry executive who would supervise them efficiently. The part of this work he is able to turn over to his assistant leaves him just enough time to take care of subjects such as production schedule and labour.

The present-day tendency, therefore, is to relieve the foundry executive of such questions as raw-materials inspection, melting practice and inspection of the quality of the finished products. These are questions that can be handled to advantage by an efficient laboratory organisation.

Raw-Materials Inspection.

The raw materials used in the foundry are numerous, and each presents characteristics by which can be judged its value for the use for which it is intended. The most important of these materials are:—Pig-iron, ferro-alloys, cast-iron and steel scrap; moulding and core sands; limestone, bricks and general refractories; coke and foundry blackings; core oils and core compounds, etc.

For each of the above items there is a particular specification which sets out the characteristics the material should possess to meet the requirements of both efficient use and low cost. These specifications must be formulated by the laboratory. Further, when the materials ordered have been received, these must be checked to determine whether they possess the specified properties.

The statement that the specifications should be formulated by the laboratory merits a little explanation. The ideal specification is one that first covers a material that will give entire satisfaction in practice and can be obtained easily on the market at a low price. It necessarily follows that, for the laboratory to formulate such a specification, it must work in close co-operation with the foundry executive and the buyer. In other words, the laboratory takes as a basis those materials which have already given satisfactory service, so that one can assure oneself that future deliveries of raw materials will give the same desired results and will be just as economical.

Quality of Finished Products.

It follows, naturally, that the chemist, being responsible for the quality of the raw materials for which he has given specifications, should also be held responsible for the quality of the metal in the finished product (grey iron, malleable iron, bronze, aluminium, light alloys, etc.). The customer, or sometimes another department in the same works, requires certain properties in the product delivered from the foundry, as, for example, tensile and transverse strength, elongation, bend, hardness, etc.

It is after the examination of these requirements that the specifications for raw materials are drawn up, and the laboratory should ensure that the desired results have been obtained before the products are delivered to the customer or to another department.

Melting Practice.

It will easily be understood that correct raw materials do not necessarily guarantee the quality of the finished product. The transformation process of melting plays an important rôle in the final properties. Therefore, as the chemist is held responsible for the quality of the finished product, so that all the factors are under his control he should also be responsible for the melting. This means to say that he should have control of (1) the calculation of the mixture; (2) the charging of the cupola; (3) the melting itself, including fuel consumption and blast conditions, which (4) naturally controls the temperature of the metal at the spout.

MR. R. ARZENS.

The equipment necessary to obtain desired results with an organisation of this kind can be divided into two classes. Firstly, the laboratory equipment, and secondly, the shop equipment.

Laboratory Equipment.

Chemical Analysis.—The laboratory should be equipped for the rapid chemical analysis of all those raw materials tested in this manner and the analysis of the finished product. It must be emphasised that the most accurate chemical analysis, if finished too late, is of no value whatsoever, and that sometimes a certain degree of accuracy can be sacrificed to rapidity and much more accomplished thereby.

Physical Testing.—The laboratory should be equipped for conducting all the normal physical tests (tensile strength, elongation, transverse strength, bend, hardness, etc.), for which there is on the market a number of universal machines that make all these tests possible.

Sand Testing.—Only the apparatus for testing new sands should be in the laboratory. This apparatus consists of a series of sieves and a shaker for sieve analysis for determining permeability and clay content, detailed information on which can be found in the American Foundrymen's Association's handbook on standard sand-testing methods.

Shop Equipment.

Sand Testing.—In the foundry itself should be installed three simple pieces of apparatus: a sand rammer, permeability apparatus and strength-testing machine, with the necessary balance and weights (this apparatus is also covered by the A.F.A. standards). These are used for testing floor sands and determining the effect of new sands on floor sands. They enable one to check the three chief properties of floor sands—moisture content, permeability and strength.

Cupola Control.—In cupola control the three factors to be considered are blast characteristics, waste gas analysis and metal temperature. The main characteristics of the blast are the wind-box pressure and the volume discharged into the cupola. Both should be indicated and recorded simultaneously on the same diagram, the optimum readings being determined and kept constant. Waste gas analysis should consist of the determination of CO and CO_2. The temperature of the metal can be determined only by means of an optical pyrometer. The combination of the figures given by gas analysis and metal temperature should indicate the amount of coke necessary and the optimum blast conditions.

Pyrometric control is also an essential for obtaining the best results in annealing malleable iron. All of the apparatus and processes enumerated above yield a certain number of figures and particulars, the value of which increases with their exactitude and the care with which they are assembled for future reference. For each cast one should record the mixture calculation, the analysis of the metal obtained, its physical properties, and the melting practice adopted, the records being as complete as possible.

Progress.

In all industries, and especially in the foundry industry, enormous strides are being made towards perfection. The foundry that does not keep step with this progress finds itself soon outdistanced by competitors. There is no better liaison officer between the foundry and the outside world than the chemist. He should keep himself abreast of discovery and development by reading the best technical journals, by attending as frequently as possible the meetings of metallurgical societies in his district, and by personal contact with other metallurgists, from which there can only come benefit for all concerned.

The cloud of mystery, which formerly surrounded metallurgy and foundry practice, was broken through long ago, and the last vestiges of this are being slowly driven away. Every foundryman and metallurgist should understand that no longer are there secrets in the trade, and that the more he reveals the more he will learn. The time is past when every foundryman made his own secret little mixtures from so much No. 1 and so much No. 2, with so much scrap, and kept this information jealously guarded in the notebook he kept in his pocket. Mixtures and results should be recorded clearly and in full detail, and this information kept open to all who may show an interest in it; the more the better, since those

(*Concluded on page* 414.)

* Paper presented at the Twenty-Eighth Annual Convention of the Institute of British Foundrymen at Birmingham.

Preventing Uneven Chill in Chilled Moulds.

By "Cylindre."

During the past few months a considerable amount of research has been published on the breakage of chilled rolls. Whilst the whole of the work has been of an admirable character, the main issue has been in all cases overlooked. However, it is within the author's very wide experience that the main cause of these breakages is due in 95 per cent. of cases to uneven or eccentric chill.

The subject of the chills which form the barrel of the mould and roll has long been a favourite with inventors. Water-cooled chills, built-up chills and split chills intended to follow the contraction of the roll when cooling, have been tried without any apparent success.

The depth of chill on the body of the roll is made to suit the purpose to which the roll is to be applied. If a roll is to be finished plain for sheets or tin plates, a shallow chill is desirable. If the roll is afterwards to be finished with grooves, then the chill on the body of the roll should be deeper, and for such rolls 2 and 2½ in. of chill are called for. For large plate rolls, sheet rolls and tinplate rolls and rolls for the rolling of non-ferrous metals, the safe depth lies between ⅝ and 1⅛ in., but preferably from ⅝ to ¾ in. Users of tinplate and sheet rolls, as well as rolls for non-ferrous metals, object to unnecessary depth of chill as operating against the strength of the roll, preferring a reasonably shallow chill as giving promise of greater life. As the strain to which rolls are subjected in service is sometimes very great, it necessarily follows that strength is a most important consideration, and, to secure this, too great care cannot be taken in the choice of raw materials and control of process.

Uneven Chill.

This fault has been attributed to various causes by men of much intelligence and experience. They differ widely in their views concerning it. Some have even supposed that the lack of uniformity in the depth of chill was caused in some manner by the mixture employed not being homogeneous when cast. This theory, needless to state, is as untenable as the theory, expressed by one, that the irregularity was caused by the moulds not being dead level. The real cause of uneven chill is due to the following natural phenomena. Just as soon as a roll has been cast and the cooling and contraction of the roll begin, soon after the iron in the sink head begins to sink, and from time to time as the sinking goes on, fresh iron is poured into the sink head, and thus demand and supply of more hot iron goes on until no further hot metal can be absorbed. It is now that the iron is passing from a molten to solid condition, and the whole casting is shrinking within its mould. The length is shortened whilst the diameter of the body of the roll is decreasing and the roll is leaving the walls of its chill mould. The correct theory, then, is that in shrinking the roll body does not leave the walls of the chill equally, but that it often leans more to one side than to the other. If this really be correct, then the side of the chill mould with which the roll body remains in contact, produces a deeper chill on the roll, and that side of the roll body which departs from its chill has a shallower depth of chill.

If in all rolls, after they are cast, that is, from the actual time that the pouring of the metal is ended, shrinkage could be controlled so as to ensure that the casting leaves the surface of its chill mould, the rolls would invariably possess an even, regular depth of chill, and not result in some rolls having perhaps a ½-in. depth on one side and 1½ in. on the other. The chilled portion of a roll does not expand and contract equally with the open grey irons in the core of the roll. No external mechanical means could be devised that would satisfactorily allow or compel a roll when within its mould to shrink away from all sides alike, and, whatever means may be resorted to, to be effective, must begin to act from the precise instant that contraction in the casting begins and must follow it during the period of solidification.

A Method of Ensuring Even Chill.

The chill on the roll is formed in the earlier part of the period of contraction, and if it is then held centrally within the chill mould it can in the final stages "go as it may," and still not interfere with a uniform depth of chill being formed on the roll. With this object in view, some chills in which the bodies of the rolls are cast have a number of notches or recesses formed on their inner surface and near their upper ends, so that when the cast should be made these notches would form corresponding

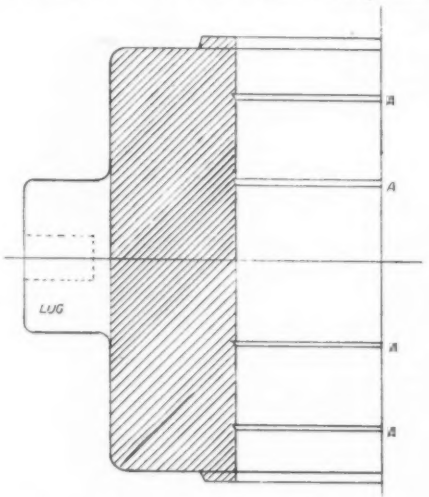


Fig. 1.—Half-Section of Chill Mould, showing the Bevelled Grooves at A.

projections on the surface of the roll bodies. These projections were first made to have their lower edges bevelled or inclined downwardly, so formed by the shape of the recesses that produced them. Now, as the roll made in such a chill would begin to sink at its upper end, it would at the same time diminish in diameter, in other words, the roll would still leave the walls of its chill.

When leaving its walls inwardly and downwardly, the bevelled edges of the projections on the body, bearing on the bevelled edges of the recesses of the mould, would from all sides compel the roll in shrinking to depart evenly from the walls of the mould towards the centre.

These cause the casting to maintain a central position while the chill on the roll is being formed during solidification and contraction. After a number of rolls had been very successfully made, a greater number of these notches were added, so that being close together more certainty would be established, and this was done with still better results.

A Further Improvement.

Next, if a series of closely-formed notches served well, why not a continuous recess, or a small groove around the circumference of the inner wall of the chill? This was done, and the ridge or band thus formed on the upper end of the roll body served even better than all else. This final scheme is shown in Fig. 1, the grooves being indicated at A.

Now, as long and short rolls are from time to time cast in the same chills, a number of these grooves were bored in the chills, equidistant from top and bottom.

The means here described of supporting the roll during contraction will also assist in preventing rupture and surface cracks, and will admit the use of stronger irons higher in shrinkage than the weak irons, hence adding to the strength of the roll.

Note particularly that any projections that may be cast on the surface of a chilled roll must not project from its body to such a degree as will prevent the chill mould being stripped off the roll. These ridges stand out on the largest roll not more than $\frac{3}{16}$ in. and correspondingly less on smaller rolls. All rolls so made are of uniform depth of chill, and, in addition, are very nearly always of the same depth at each end of the roll, not as formerly, always deeper in the lower end than the upper end.

By a little study of the mould as it has here been described, it will readily be seen that it would be impossible to make any chilled roll in such a mould having an uneven depth of chilled surface, for the reason that from the cylindrical surrounding chill the contracting hot roll is compelled to depart equally and at the very instant contraction begins. As it departs, the bevelled edges on the inner surface of the chill, acting on the bevelled edges of the ridges on the body of the roll, keep the mould central with the shrinking roll until solidification of the chilled surface has taken place.

The Laboratory and the Foundry.

(*Continued from page* 413.)

who understand these questions will understand the attendant difficulties and problems, and this universal understanding makes for, as in all trades, better quality, associated with lower costs.

Conclusion.

The author has tried to give a brief description of the laboratory's duties towards the foundry. It is realised that the problems encountered are numerous and varied. But the task is easier when a frank and friendly co-operation exists between the foundry executive and the chemist. Each has something he can give the other. Both science and shop practice will benefit by a full understanding of each other's problems. As a final piece of advice, the author would ask the chemist not to regard the practical foundryman as being devoid of intellect, and the foundry executive not to imagine that the chemist has been brought in either to interfere or to spy. By co-operation much can be accomplished.

Birmingham Convention Fund.

Mr. F. K. Neath, the honorary Convention Treasurer, has sent us a final list of subscriptions to the Birmingham Convention Fund. This list is set out below:—

	£	s.	d.
Amount previously acknowledged ...	387	12	0
S. Flavel & Co., Ltd.	10	10	0
Armstrong-Siddeley Motors, Ltd. ...	10	0	0
British Piston Ring Co., Ltd. ...	5	5	0
Anonymous	2	2	0
Mr. E. H. Tyson	1	1	0
Mr. E. R. Briggs	1	0	0
Total	£417	10	0

Meetings are to be held at Stockport on June 29 of the shareholders of Messrs. Craven Bros. (Manchester), Limited, to consider a scheme for the reduction of the capital by £180,686 by writing off £2 10s. from each issued preference share of £5, and 15s. from each issued ordinary share of £1. Arrears of preference dividend are to be cancelled and the entire capital is to be consolidated into £1 ordinary shares.

INSTITUTE OF BRITISH FOUNDRYMEN.

TWENTY-EIGHTH ANNUAL CONVENTION AT BIRMINGHAM.

The Institute held its Twenty-Eighth Annual Meeting and Conference from June 9 to 12, 1931, at Birmingham and Coventry, under the presidency of Mr. A. Harley, of Coventry.

As usual, a well-balanced programme of discussions, visits to works and social functions was arranged for the instruction of the members and for the entertainment of themselves and their ladies, thanks to the efforts of the Local Reception Committee and the Hon. Convention Secretaries, Mr. F. H. Hurren and Mr. F. K. Neath (of the Birmingham Branch), and, of course, the Institute's General Secretary, Mr. Tom Makemson.

TUESDAY JUNE 9.

Reception by the Lord Mayor and Lady Mayoress.

A meeting of the General Council of the Institute was held on Tuesday afternoon, June 9. In the evening the members and their ladies were received by the Lord Mayor and Lady Mayoress of Birmingham (Alderman W. W. Saunders, J.P., and Mrs. Saunders), at the Council House, and spent a very jolly evening together.

WEDNESDAY, JUNE 10.

On Wednesday morning, June 10, a civic welcome was extended by the Lord Mayor to the members and their ladies, assembled at the Grand Hotel, Birmingham.

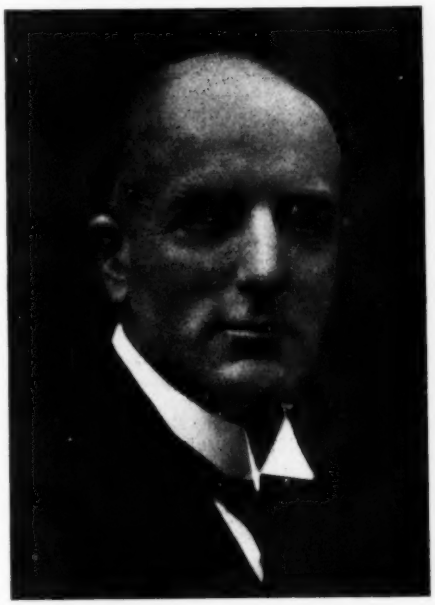
MR. F. P. WILSON, J.P. (the retiring President of the Institute), formally introducing the the Lord Mayor, said that the members were privileged and honoured that he should be present at the opening of the conference. The Lord Mayor and the Lady Mayoress had already shown their hospitable spirit by the manner in which they had entertained the members and ladies on the previous evening at the Council House, and the members as a whole felt that seldom, if ever, had they been so well treated and so graciously entertained as they had been on that occasion.

Civic Welcome.

THE LORD MAYOR returned thanks for the kind references made to himself and the Lady Mayoress. The City of Birmingham, he continued, had always been closely connected with the foundry industry, and, if for that reason alone, he had the greatest pleasure in welcoming the members of the Institute to the City. He was pleased that the Institute had decided to hold its conference this year in Birmingham, and had resisted the temptation to hold it at a seaside resort. He had attended many conferences, and on occasions when votes had had to be cast as to the venue of subsequent conferences, and if he were sure that he would be attending, he had always voted for the seaside. (Laughter.) At this time of the year particularly, the seaside had a magnetic influence over business men who desired to meet together and to discuss problems of the greatest importance; possibly large doses of ozone stimulated the brain to greater activity, and possibly there might be other reasons, of which he was not very well aware, for favouring the seaside. (Renewed laughter.) However, he was pleased that the members of the Institute of British Foundrymen had selected Birmingham as the venue for the annual meeting. There was much in Birmingham and the neighbourhood which was of particular interest to them, and when they tired of inspecting foundries—if they ever tired of that—they would find within a few miles of the City a countryside as beautiful as was to be found in any part of the country.

The Lord Mayor extended a hearty welcome to the members and their ladies, and expressed the hope that their stay in Birmingham would prove interesting and pleasurable in every way. He and the Lady Mayoress had been honoured on the previous evening in having many of them as guests. It might seem strange to some that he was extending a welcome to them at this stage, as if he and they were perfect strangers; lest it be imagined that it was a Birmingham custom to entertain first and to welcome afterwards, he said that the time of the reception was dictated by circumstances over which he had no control. The programme was such that, if the reception had been arranged for any other evening, he would have inconvenienced the visitors very considerably.

Birmingham was proud of the fact that within its area there were many old-established engineering firms of world-wide repute, and also a great number of foundries whose products were of the highest quality. Birmingham claimed, of course, that everything it produced was of good quality, so that the foundry industry was not an exception in that regard; for example, it claimed that the best possible jewellery was made there. History had been made in Birmingham by the genius of Boulton, Watt and Murdoch, and he believed that the spirit of invention which was so evident in the days of those pioneers was still as strong among its industries.



MR. A. HARLEY

(The New President of the Institute of British Foundrymen).

Mr. Harley is a native of Falkirk and was educated at the Falkirk High School and the Glasgow Technical College. He received his training as metallurgical chemist in Carron Company's laboratories, under his uncle, Mr. Boston Harley. He was associated with the Alloa Coal Company for about two years, and was engaged with the Coalbrookdale Company, Shropshire, for nine years, as an assistant to the late Mr. Duncan Sinclair, the general manager. Subsequently, the Daimler Company, Limited, appointed him to supervise the erection of their new foundry, which he has managed for the past twenty-one years. About nine years ago he was placed in charge of the company's general laboratories and heat-treating department. Mr. Harley joined the Institute in 1910 and is a past Branch-President.

Finally, the Lord Mayor regretted that he was unable to stay with the members in order to hear the various Papers read and discussed, not because he would want to discuss them, but because they contained much of interest and value. He expressed the hope that the conference would prove to be of great value to the Institute and to the industry in general, and that each one of the visitors would leave Birmingham with regrets and a determination to visit the city again as soon as possible.

Presentation of the Oliver Stubbs Medal.

The RETIRING PRESIDENT asked the Lord Mayor to present the Oliver Stubbs Medal for the year to Mr. J. Cameron, J.P. (Past-President). The Medal, he said, was the highest honour that it was in the power of the Institute to confer, and it was given as a recognition of distinguished services to the industry and to the Institute. Mr. Cameron was probably as well known as, if not better known than, any other member of the Institute, so that it was not necessary to laud him, though (added Mr. Wilson) he would have been glad of an opportunity of doing so.

THE LORD MAYOR, before presenting the Medal, said that the Oliver Stubbs Medal was presented annually to the member of the Institute who had rendered the greatest service to the Institute as a whole. The award was made this year to Mr. Cameron for his many services to the Institute generally, and for the way in which he had advanced the technical knowledge of the industry by investigating new developments and placing his experience at the disposal of the members of the Institute. It was a very real pleasure, said the Lord Mayor, to present the Medal to Mr. Cameron; though he had had the privilege of presenting probably hundreds of medals in recognition of various services during his career, he could not remember any the presentation of which had given him more pleasure than this, or one which had been better earned by work carried out in the interests of the country. It was richly deserved, and, being himself a craftsman, the fact that Mr. Cameron had done so much to advance technical knowledge appealed to him strongly. During the whole of the 18 years in which he had been a member of the Birmingham City Council he had been a member of its Technical Committee; he was one of those who had urged the provision of better technical education in Birmingham than that which existed there, but there were difficulties, due to the financial stringency which some people talked about but which he never understood, believing, as he did, that when the interests of the country called for anything it was not wise to attach too much importance to the question of its cost.

Finally, the Lord Mayor again expressed his pleasure in presenting the medal, and expressed the hope that Mr. Cameron would live long to treasure it.

The Medal was presented, amid applause.

MR. CAMERON, responding, assured the meeting that he was very proud of the honour which his fellow-members of the Institute had conferred upon him, and said he was afraid that it would be necessary for him to order a new hat. (Laughter.) He appreciated the award also because Mr. Oliver Stubbs, one of the Past-Presidents of the Institute, was a personal friend. He recalled that in the early days, when he was a humble visitor from the Scottish Branch to the Institute's Conventions, it was Mr. Oliver Stubbs who had nominated him for election to the General Council, and, at a later date, it was Mr. Oliver Stubbs who had suggested that it was about time that he took office. At the same time, when he remembered the distinguished members who had been awarded the Medal in previous years, he felt that he might have done a good deal more than he had done to earn it. Nevertheless, he valued it greatly, and he thanked the Lord Mayor, as a brother craftsman—for he also had entered the moulding shop at the age of 16 years, at a remuneration of 4s. per week—for the gracious manner in which the presentation had been made.

Vote of Thanks to the Lord Mayor.

The RETIRING PRESIDENT asked the members to extend their very heartiest thanks to the Lord Mayor for his presence at the meeting and

for his modest address. The members appreciated very highly, he said, the fact that the Lord Mayor had been a craftsman and held craftsmanship in such high esteem; it was not clear whether or not he still practised his craft, but the members did appreciate the fact that he had been a craftsman, and, judging from the cut of his gib, he had been a very sound one. The retiring President also voiced the thanks of the members to the Lord Mayor and the Lady Mayoress jointly for their hospitality on the previous evening.

Mr. A. Harley (President-Elect), seconding, said that this vote was a very real and sincere expression of gratitude on the part of the members to the Lord Mayor and Lady Mayoress, and to the Corporation of Birmingham. The Lord Mayor had shown genuine interest in the proceedings of the Institute, and the members wished him good health and happiness.

The vote of thanks was carried with acclamation.

The Lord Mayor, responding, assured the meeting that he still prized the tools of his craft, and, for sentimental reasons, he would not part with them for £100.

The Lord Mayor then withdrew.

Greetings from Kindred Societies.

The General Secretary (Mr. Tom Makemson) announced the receipt of messages of goodwill from foundrymen's associations abroad and from friends in this country. A telegram conveying cordial greetings and best wishes for the success of the conference, on behalf of the Association Technique de Fonderie de France, had been sent from Paris by Mr. Cury, the President of that Association. A note conveying good wishes had also been received from Mr. Ramas, Past-President of the French Association, and an honorary member of the Institute.

A letter received from the American Foundrymen's Association was as follows:—

"At the general opening meeting of the American Foundrymen's Association Convention in Chicago, last week, the membership, by vote, instructed the International Relations Committee to convey their respects and good wishes to the Institute of British Foundrymen. This is a duty which, I am sure, it is a pleasure to perform, and I ask that, at the next meeting of your officers, you acquaint them with this action of the American Foundrymen's Association.

"The Convention and Exhibition, contrary to advance expectations, were highly successful, despite the general business depression which continues. The attendance and interest this year was exceptional, and evidenced more than ever the growing appreciation of the foundry industry for the technical information available through foundry association work.

"We were particularly pleased to have Mr. John Shaw present to read the Institute of British Foundrymen's Exchange Paper by our friend Mr. V. C. Faulkner. Will you please convey to the latter our best thanks for this Paper, and also the personal regards of the writer?

"(Sgd.) Dan M. Avey, Chairman,

"International Relations Committee."

A further telegram received was from Mr. Hollinworth, the late general secretary of the Institute, conveying heartiest good wishes for a successful conference.

Apologies for Absence.

Letters expressing regret that they were unable to attend were received from Mr. C. E. Williams (Cardiff) and from Mr. F. G. Starr (Past-President of the Birmingham, Coventry and West Midlands Branch). The latter, who was in hospital, expressed heartiest congratulations to Mr. Harley (President-Elect of the Institute) and best wishes for success during his year of office as President.

The secretary was instructed to reply to the various messages.

ANNUAL GENERAL MEETING.

The business of the Annual General Meeting of the Institute was then proceeded with. The retiring President (Mr. F. P. Wilson, J.P.) again presided.

The minutes of the preceding Annual General Meeting, held in Middlesbrough on June 18, 1930, were taken as read, and were confirmed and signed.

Annual Report of General Council for Session 1930-31.

The General Council presents the annual report for the year 1930-31, and the financial statement for the year ending December 31, 1930.

Roll of the Institute.

During the year 3 subscribing firms, 71 members, 104 associate members, and 18 associates have been elected, making a total of 196. In November and December, 1930, the membership roll was revised again, and the names of non-paying members erased. The losses due to this revision and to resignations and deaths amount to 145; there is therefore a net increase of membership of 51. The number of members who have been transferred to higher grades during the year is seven. The table above gives an analysis of the membership roll on April 30 last.

	Subscribing firms.	Members.	Associate members.	Associates.	Total.
Birmingham, Coventry and West Midlands ..	2 (2)	95 (98)	115 (115)	19 (23)	231 (238)
East Midlands	5 (5)	45 (44)	96 (92)	2 (1)	148 (142)
Lancashire	7 (7)	105 (106)	185 (185)	13 (9)	310 (307)
London	5 (5)	158 (150)	85 (88)	12 (12)	260 (255)
Middlesbrough	5 (4)	27 (18)	42 (38)	8 (4)	82 (64)
Newcastle	8 (9)	46 (49)	50 (46)	69 (89)	173 (193)
Scottish	4 (3)	81 (69)	166 (151)	21 (22)	272 (245)
Sheffield	6 (6)	81 (78)	82 (68)	9 (8)	178 (160)
Wales and Monmouth ..	1 (1)	28 (27)	36 (33)	1 (1)	66 (62)
West Riding of Yorkshire	— —	31 (29)	53 (52)	2 (2)	86 (83)
Unattached	— —	28 (33)	9 (10)	1 (1)	38 (44)
	43 (42)	725 (701)	919 (878)	157 (172)	1,844 (1,793)

The figures in brackets are for the year ending April 30, 1930.

Honours Conferred on Members.

The General Council and the whole of the members note with considerable gratification that in the last New Year's Honours, Mr. Wesley Lambert was appointed a Commander of the Order of the British Empire. The heartiest congratulations of the members of the Institute are tendered to Mr. Lambert upon the receipt of this honour, which is merited by his long and distinguished career as a metallurgist, and by his Presidency of the International Foundry Congress of 1929.

Finance.

The statement of accounts has been duly audited and certified by Messrs. J. & A. W. Sully & Company, and is included in this report.

Middlesbrough Conference.

The Twenty-seventh Annual Conference was held at the Constantine Technical College, Middlesbrough, from June 17 to 20, 1930. The proceedings opened with a social gathering at the Constantine College, and members and their ladies inspected the College, which had been opened only a few months previously. At the Annual General Meeting, on June 18, Mr. F. P. Wilson was installed President.

Although the Middlesbrough Branch has been in existence only a few years, the arrangements which were made for the Conference were most complete and successful, and the thanks of the Council are due to the Branch for its courage in undertaking the organisation of such an important event, and for the very thorough and considerate way in which all the details were carried out. The Council also wishes to thank the authors of Papers which were presented; the various firms who permitted the members to visit their works; the Mayors of Middlesbrough and Stockton-on-Tees; the Governors of the Constantine College; Mr. Wm. Shaw, President of the Middlesbrough Branch, and Mrs. Shaw, for their hospitality in entertaining the members and ladies at a garden party; all the subscribers to the Conference Fund, and all who contributed in any way to the success of this event, and particularly Mr. F. A. Harper, the Honorary Conference Secretary.

Examinations in Foundry Practice.

The inauguration of examinations in foundry practice has engaged the attention of the General Council and of the Education Committee for some time, and the British Cast Iron Research Association, which was engaged in the formation of a similar scheme, placed its experience at the disposal of the Institute. The Council is pleased to report that the arrangements are now practically completed.

The City and Guilds of London Institute for many years has conducted examinations in all parts of the British Empire in technical subjects, and, at the request of this Institute, has now completed arrangements for holding examinations for students who have completed courses in patternmaking and in foundry practice and science.

Following the usual practice of the City and Guilds of London Institute, an Advisory Committee was formed consisting of representatives of the Institute of British Foundrymen and of various educational and technical associations. Mr. E. R. Briggs, a member of the Institute, who is also chairman of the Education Committee of the British Cast Iron Research Association, is chairman of this Advisory Committee, and Mr. S. H. Russell, Past-President of the Institute, is vice-chairman, whilst the general secretary acts as honorary secretary of the Committee.

Numerous meetings of the Advisory Committee and a Sub-Committee have been held since the beginning of 1930, and complete syllabuses and regulations have been drafted by this Committee and have been adopted by the City and Guilds of London Institute. These syllabuses and regulations will come into operation in the Session 1931-32, and technical colleges in all parts of the country will then be in a position to organise courses of instruction leading up to the examinations. The certificates which are issued as a result of these examinations will be endorsed by the President of this Institute.

It will be remembered also that the Institution of Mechanical Engineers, in conjunction with the Board of Education, agreed to initiate a modification of the Institution's national certificate suitable for students of foundry practice. This

certificate will be a national diploma of high technological standard, and will be signed by the President of the Institution of Mechanical Engineers and endorsed by the President of the Institute of British Foundrymen.

Unlike the City and Guilds Certificate, there is no standard syllabus. Technical colleges, which have been approved for the purpose and whose courses of instruction have been approved, conduct their own examinations each year, but in the final year, a board of Assessors may revise the examination questions and they may also revise the markings of the papers worked by the candidates; the standard throughout the country is thus kept uniformly high. It will be noted that attendance at a recognised course is a necessary requirement to obtaining this certificate. During the Session 1930-31, five colleges submitted courses which were approved for the purpose of this scheme.

The success of the two schemes will depend largely upon the number of students presenting themselves. As this Institute is largely responsible for the initiation of these schemes, it is obviously necessary for it to take all possible steps to ensure that they be taken full advantage of by the younger members of the foundry trade. Members of the Institute are asked therefore to bring these schemes to the notice of their apprentices and junior employees, and they are asked also to co-operate, when necessary, with the local education authorities with a view to the inauguration of classes in centres where classes do not exist at present, and also in connection with such general guidance as may be required by the local authorities.

Technical Committee.

As indicated in the last annual report, the Test-Bar Committee, which carried out such valuable work, has now been superseded by the Technical Committee, which has set up sub-committees for specific sections of the industry.

For some years past, the Institute has been approached, to an increasing extent, for its views on many technical subjects connected with the industry, and has been invited to nominate representatives to national committees such as those of the British Engineering Standards Association. This work has been carried out, but there has been no organised machinery for supervising this work and for providing it with the necessary link with the Institute, and it is expected that the Technical Committee and its sub-committees will fill this gap. At present the sub-committees are engaged upon collecting information on the large number of specifications which are issued, with a view of endeavouring ultimately to arrange for more complete standardisation of specifications, and in this work they have taken the initial steps to co-operate with the recently formed Iron and Steel Industry Committee of the British Engineering Standards Association.

In order to keep the members of the Institute in touch with current foundry literature, it has been decided to prepare and circulate periodically, a list of titles and references of current literature published through the world and dealing with foundry subjects. It is expected that this service will be put into operation in the course of a few weeks.

There are many specific technical problems affecting the industry which it will be the function of the Technical Committee to investigate and report upon for the benefit of the members of the Institute, and in the near future members will find that the value of their membership of the Institute has increased considerably as a result of the activities of the Technical Committee and of its sub-committees.

It cannot be emphasised too strongly that there is no intention to overlap or compete with the valuable work which is being carried out by the British Cast Iron Research Association; in fact the Association has permitted several members of its staff to serve actively on various sub-committees of the Technical Committee, and the General Council wishes to record its thanks to the British Cast Iron Research Association for this co-operation.

Membership Badge.

In response to a number of requests, arrangements have been made to issue a membership badge with the member's name engraved upon it. It is expected that this badge will be worn on works visits and at social functions, and will take the place of the badge issued annually at each Conference.

Employment Register.

By the courtesy of Mr. Barrington Hooper, C.B.E., managing director of THE FOUNDRY TRADE JOURNAL, arrangements have been made for members seeking a change of employment, or who are out of employment, to announce their requirements in THE FOUNDRY TRADE JOURNAL free of charge. Correspondence regarding this service should be forwarded to the general secretary, who will arrange for replies to be forwarded to the members.

MR. VICTOR STOBIE, M.I.E.E.

(Senior Vice-President).

Mr. Stobie was born in Birmingham, and was educated in that city and at St. Maur's School, Paris. He studied electrical engineering in the Electrical Engineering Department of University College, Sheffield, and entered the Metallurgical Department of the same college, where he was under Profs. Arnold and McWilliam. In 1905 he patented a highly-successful method of annealing long bars of high-carbon steel in producer-gas-fired furnaces, and at about the same time established the Sheffield Annealing Works. The Stobie Steel Company was founded in 1909, and a year later Mr. Stobie was commissioned by Electro Metals, Limited, to design an electric furnace in which were incorporated some Swedish patents. This furnace, installed in his works, was the first commercial British-designed electric-arc furnace. In 1912 he disposed of his Sheffield interests and established electric steelworks at Dunston, and recently he designed and installed a 7½-cwt. high-frequency induction steel-melting furnace. Mr. Stobie has presented Papers before the Institute of British Foundrymen, the Iron and Steel Institute, the Institution of Electrical Engineers, the West of Scotland Iron and Steel Institute, the Cleveland Institute of Engineers and the Sheffield Society of Engineers and Metallurgists, of which bodies, with one exception, he is or has been a member. He joined the Institute of British Foundrymen in 1912 and was President of the Newcastle Branch during 1927-28.

Awards.

Oliver Stubbs Medal.—The ninth award was made in June, 1930, to Mr. James Ellis, Past-President, "for sterling work done in connection with the Institute, and more particularly for his efforts to encourage the Junior Sections."

Members will have noted with great regret that Mr. Ellis developed a serious illness in the summer of last year, and passed away early in October. The Council wishes to place on record its gratification that it was possible to acknowledge the Institute's indebtedness to Mr. Ellis during his life time, by awarding him the Oliver Stubbs Medal. The Council also wishes to accord its sense of gratitude for the very large amount of devoted and enthusiastic work carried out by Mr. Ellis for the furtherance of the welfare of the Institute and of its individual members.

Diplomas.—Four diplomas were awarded in June, 1930, for Papers given before the Branches during the previous session. The names of the recipients and the respective Branches before which the Papers were presented, are as follow:—C. H. Kain, London Branch; D. K. Barclay, Middlesbrough Branch; S. Southcott, Wales and Monmouth Branch; and T. Service, Scottish Branch.

The announcement of the awards of diplomas for the Session 1930-31 will be made at the annual general meeting on June 10.

Buchanan Medals.—Buchanan Medals were awarded to members of the Junior Sections for the Session 1929-30 as follows:—N. Hubball, Birmingham Junior Section, and E. Sutcliffe, Lancashire Junior Section.

Surtees Memorial Examination.—The 1931 examinations for the prizes which are awarded from a bequest by Mr. W. Mayer, Past-President, were conducted by the Newcastle Branch and resulted in the exceptionally large number of 45 entries, this large number being due to the recently aroused interest in foundry technical training, brought about as a result of the intensive activities of the members of the Newcastle Branch. The awards were as follow:—*First Prize*—T. Brass; *Second Prize*—James Mills; *Third Prize*—W. Turnbull; *Fourth Prize*—J. Smith; *Fifth Prize*—H. Vasey; *Sixth Prize*—G. Metcalf.

John Wilkinson Medal.—The examination for the John Wilkinson Medal, open to members of the Lancashire Branch Junior Section, was won by B. Haigh.

Relations with Overseas Foundry Associations.

A party of about 35 members and ladies attended the International Foundry Conference held at Liége in June, 1930. Several members were present at the conference of the French Foundry Technical Association in Paris in October. The Institute has accepted an invitation to participate in the International Foundry Congress and Exhibition, to be held at Milan in September, 1931, and it is expected that a large number of members and ladies will take part in this event. Two meetings of the International Committee of Foundry Technical Associations have been held during 1930, at which the Institute was represented by Mr. V. C. Faulkner and the general secretary, who acts as the honorary secretary of this Committee.

Exchange Papers were presented on behalf of the Institute by Mr. J. G. Pearce at the conference of the American Foundrymen's Association in May, 1930, by Dr. A. L. Norbury and Mr. J. Deschamps at the International Congress at Liége in June, 1930, and by Mr. H. C. Dews at the French Foundry Congress in October, 1930. Mr. V. C. Faulkner was the author of the official Exchange Paper presented to the conference of the American Foundrymen's Association held in Chicago in May, 1931, and Mr. J. H. D. Bradshaw presented the official Exchange Paper at the conference of the French Foundry Technical Association, also held in May.

Kindred Associations.

The Institute's close relations with organisations representing other branches of the industry continue to be maintained, and have been cemented during the year. The joint meetings held by some of the Branches with the respective local sections of kindred associations have been continued and have proved of considerable benefit to the members of the Institute and of the other associations.

British Cast Iron Research Association.

The council of the British Cast Iron Research Association reports another year which in income, expenditure and general activity has been a record. So far as research work is concerned, great progress has been made in the establishment of recommended methods for the daily control of foundry moulding sands, and a Paper is to be presented, on behalf of the Association, on this matter at the forthcoming Birmingham Conference. The other two developments referred to in the last report, "Silal" heat-resisting iron and the "balanced-blast" cupola, have also made very considerable progress. Both may be regarded as now having arrived at the production stage. The total number of research reports issued by the Association now approaches one hundred.

During the Conference month, June, the Association reaches the most critical period of its history. In order to secure a continuance of the Government grant hitherto obtained, it is necessary to double the income received from the industry, and in order to carry out the ever-increasing work of the Association, it is imperative that this income be obtained. It is felt that the Institute can do much to help the Association at this juncture by giving this movement for increased membership its moral support and urging, through its members, all founders to give the Association their support.

Branch Activities.

The number of Papers given before the various Branches and Junior Sections was 107; a number of valuable discussions on foundry problems and a large number of works visits have also taken place. These are additional to the Papers and visits arranged in connection with the Annual Conference. The General Council wishes again to express its sincere thanks to the authors of Papers and to the managements of the various works which have been visited.

The 21st anniversary of the Scottish Branch was celebrated in Glasgow on April 17, when the Lord Provost and the Corporation of the City gave a Civic Reception at the City Chambers, which was attended by representatives of public bodies, technical associations, members of the Scottish Branch and of the General Council and their ladies. To commemorate this anniversary, the Scottish Branch has provided the Sir Archibald MacInnes Shaw Prize, the deed of gift of which was formally handed over to the Lord Provost of the City at the Civic Reception. The General Council wishes to congratulate the Scottish Branch upon the successful and valuable work which it has done during this long period, it also wishes to thank the Branch for the hospitality accorded to the Council on this occasion. A considerable number of new members have joined the Institute through the medium of the Scottish Branch as a direct result of this important celebration. An opportunity was taken to make a presentation to Mr. A. Campion, on behalf of the Scottish Branch, as a recognition of his devoted services to the Branch during this period, and a presentation was also made to Mr. and Mrs. Campion on behalf of the General Council.

General Council.

Four General Council meetings and a large number of committee meetings have been held at Middlesbrough, Gloucester, Manchester and Glasgow. Additionally, a large number of meetings of the Technical Committee and its sub-committees have been held at various centres, and the Advisory Committee, which works in conjunction with the City and Guilds of London Institute, together with its sub-committee, has held meetings in London and Birmingham. The average attendance at the General Council meetings was 35.

The General Council consists of:—(*a*) Past-Presidents of the Institute, (*b*) members elected by the Branches, (*c*) Branch-Presidents and secretaries and (*d*) ten members elected at the Annual Conference for two years (five are elected each year).

The following five members elected at the Annual Conference in 1929 retire at the annual meeting on June 10, 1931:—Messrs. A. Firth, W. T. Evans, J. Haigh, H. Winterton and D. H. Wood. Messrs. Firth, Winterton and Wood offer themselves for re-election.

Honorary Treasurer.

As announced in the last annual report, Mr. F. W. Finch decided not to offer himself for re-election as honorary treasurer, and Mr. W. B. Lake, J.P., of Braintree, Past-President of the London Branch, was unanimously elected honorary treasurer at the last annual general meeting in place of Mr. Finch. The Council again wishes to emphasise its appreciation of Mr. Finch's long and active work in connection with the Institute.

Birmingham Conference.

The Twenty-eighth Annual Conference will be held at Birmingham and Coventry from June 9 to 12, when Mr. A. Harley, President-Elect, will be installed President of the Institute.

F. P. Wilson, *President.*
T. Makemson, *General Secretary.*

BALANCE-SHEET, DECEMBER 31, 1930.

Liabilities.

	£ s. d.	£ s. d.
Subscriptions paid in advance		139 5 0
Sundry Creditors		408 12 5
The Oliver Stubbs Medal Fund—		
Balance from Last Account	201 19 4	
Interest to date	8 1 10	
	210 1 2	
Less: Cost of Medal	8 10 0	
		201 11 2
The Buchanan Medal Fund—		
Balance from Last Account	106 15 2	
Interest to date	4 12 1	
		111 7 3
International Conference Fund—		
Surplus included in General Investments		40 18 11
Accumulated Fund—		
Balance at December 31, 1929	1,349 19 3	
Add: Excess of Income over Expenditure for the year ended December 31, 1930	4 1 10	
		1,354 1 1
		£2,255 15 10

Assets.

	£ s. d.	£ s. d.
Cash in Hands of Secretaries—		
Lancashire	58 13 6	
Birmingham	60 7 4	
Scottish	26 10 8	
Sheffield	116 18 6	
London	37 4 3	
East Midlands	25 0 10	
West Riding of Yorkshire	21 2 10	
Wales and Monmouth	17 9 0	
Middlesbrough	26 14 7	
		390 1 6
Sundry Debtors—		
Sheffield Branch Expenditure disallowed		32 18 5
Lloyds Bank Limited		282 15 0
The Oliver Stubbs Medal Fund—		
£342 5s. 7d. Local Loan £3 per cent. Stock at cost	200 0 0	
Balance at Lloyds Bank Limited	1 11 2	
		201 11 2
The Buchanan Medal Fund—		
£125 £3 10s. Conversion Stock at 78	98 6 9	
Balance at Midland Bank, Limited	13 0 6	
		111 7 3
Investments Account—		
£450 5 per cent. War Loan at cost	430 9 10	
£300 5 per cent. Conversion Stock, 1944–64, at cost	297 14 11	
£653 19s. Local Loans 3 per cent. Stock at cost	451 13 8	
		1,179 18 5
Furniture, Fittings and Fixtures—		
Per last Account	85 15 8	
Less: Depreciation 10 per cent.	8 11 7	
		77 4 1
		£2,255 15 10

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED DECEMBER 31, 1930.

Expenditure.

	£ s. d.	£ s. d.
Postages		119 6 1
Printing and Stationery, including printing of "Proceedings"		693 9 6
Council, Finance and Annual Meeting Expenses		82 14 4
Medal for Past-President		2 5 0
Branch Expenses:—		
Lancashire	86 5 2	
Birmingham	94 15 3	
Scottish	82 14 5	
Sheffield	90 16 3	
London	78 10 9	
East Midlands	46 4 6	
Newcastle	71 9 7	
West Riding of Yorkshire	30 15 6	
Wales and Monmouth	23 0 2	
Middlesbrough	22 16 7	
		627 8 2
Audit Fee and Accountancy Charges		12 12 0
Incidental Expenses		61 15 1
Salaries—Secretary and Clerk		567 15 9
Rent and Rates of Office, *less* Received		100 18 0
Income Tax		7 16 0
John Surtees Memorial Examinations Grants to Branches		6 3 10
Subscription International Committee		5 0 0
Depreciation of Furniture		8 11 7
		2,295 15 4
Excess Income over Expenditure carried to Balance Sheet		4 1 10
		£2,299 17 2

Income.

	£ s. d.
Subscriptions Received	2,232 19 2
Sale of "Proceedings," etc.	9 6 0
Interest on Investments and Cash on Deposit	37 0 9
John Surtees Medal Fund, Surplus	20 9 6
Liége Conference Surplus	0 1 9
	£2,299 17 2

We have prepared and audited the above balance sheet with the books and vouchers of the Institute, and certify the same to be in accordance therewith.

J. & A. W. Sully & Company,
Chartered Accountants, Auditors.

19/21, Queen Victoria Street,
London, E.C.4.
May 7, 1931.

The report of the General Council for the year ended June, 1931, on the motion of Mr. J. Cameron (Past-President), seconded by Mr. J. S. G. Primrose, was unanimously adopted.

Accounts for the Year 1930.

Mr. W. B. Lake (Hon. Treasurer), moving the adoption of the balance-sheet and statement of accounts for the year ended December 31, 1930, said that the year had not been unfavourable. He drew attention particularly to the fact that during the year the investments had increased by £450; this was due to the collection of various scattered accounts, and to an appeal to the Branches to hand in part of their balances to

General Funds. The chief item in this latter respect had been a large contribution from London. This policy would be continued, and it was hoped that by the end of the current financial year the amount invested would be increased still further. On the other hand, the margin between expenditure and receipts was very small, the excess of income over expenditure for the year being only £4 1s. 10d. That fact gave rise to some anxiety, because the activities of the Institute were extending very rapidly, and money was needed for that reason. The Finance Committee would have to examine the affairs of the Institute very carefully with a view to effecting economies. Various means of reducing expenditure had been suggested to the Finance Committee, and these would be considered carefully, care being taken to ensure that the work of the Branches would not be interfered with.

The resolution for the adoption of the balance-sheet and accounts was seconded by MR. A. CAMPION, and carried.

Awards of Diplomas.

It was announced that five Diplomas had been awarded, in respect of Papers presented during the past season, to the following gentlemen:—

MR. G. M. CALLAGHAN, for a Paper before the Birmingham Branch, "Moulding a Two-Ton Press Body."

MR. F. HARRIS, before the Burnley Section of the Lancashire Branch, "A Survey of the Manufacture of Light Castings."

MR. J. K. SMITHSON, before the Middlesbrough Branch, "The Manufacture and Properties of Malleable Castings."

MR. R. LIDDLE, before the Scottish Branch, "The Moulding and Casting of Bronze Plates."

MR. J. HIRD, before the Wales and Monmouthshire Branch, "Studies in Foundry Sands."

Award of Buchanan Medal.

It was also announced that in respect of the past year only one Buchanan Medal (competed for by members of the Junior Sections) had been awarded by the Examiners. The recipient was Mr. Ben Haigh, of the Lancashire Branch Junior Section, and the award was made in respect of his essay, being a *résumé* of the work of the last session of the Lancashire Branch Junior Section.

Welcome to the Institute's First Honorary Secretary.

The RETIRING PRESIDENT, on behalf of the members, extended a hearty welcome to Mr. F. W. Finch, one of the founders of the Institute, and its first Hon. Secretary. (Applause.) (Mr. Finch's age is 85 years.) The Retiring President paid a tribute to him in respect of his long service on behalf of the Institute, and invited him to give a short account of the Institute's first meeting, in order that the members should not forget the circumstances in which its work commenced.

MR. FINCH (who was greeted with renewed applause) said that, as very few of the members were aware of the very small beginnings of this noble Institute, he proposed to read his first report, which he had presented to the Institute's first Convention, held in Manchester in 1904. This was published in THE FOUNDRY TRADE JOURNAL, August 2, 1904.

In conclusion, Mr. Finch said that it was not for reasons of old age or infirmity that he had relinquished the office of Hon. Secretary and Treasurer, though he is now 85 years of age, but by reason of other circumstances, he having to care for a blind wife. He was very proud of the part he had played in the formation of this noble Institute.

It was resolved that Mr. Finch's remarks be included in the minutes.

Election of Officers.

PRESIDENT.

The RETIRING PRESIDENT proposed, with very great pleasure, the election of Mr. A. Harley as President for the year 1931-32. Mr. Harley, he said, was one of that noble band of Scotsmen who had come to England to look after the Englishmen's jobs for them, and, in common with most Scotsmen, he had done it well. In this connection, Mr. Wilson related a little Yorkshire history, which, perhaps, was something of a parable. In Yorkshire, he said, a great many castles had been built in order to keep the Scots out, because, previous to that, nearly all the Yorkshire villages were more or less destroyed from time to time by friends from over the border. But there were some very wise Yorkshiremen in the castle of Richmond. On one occasion, when the Scots had appeared, these Yorkshiremen had not attempted to stop them, but had let them pass through. When the Scots had done their worst in villages further south—presumably Birmingham, and such places—and were returning, the Yorkshiremen had stopped them and had taken from them all that they had obtained further south. (Laughter.) The moral was apparent. Mr. Harley had been allowed to come into England, to do good work and to learn many useful things; the members of the Institute were not going to allow him to return to Scotland without profiting by what he had learned in England. The Institute had chosen well in asking Mr. Harley to accept the office of Presidency for the coming year. (Hear, hear.) He had all the qualities which fitted him for that office. There was a text "Let not him that girdeth on his harness boast himself as he that putteth it off." (Laughter.) Probably that had been used on similar occasions before, but he (Mr. Wilson) had something to boast about in putting off his harness, and it would give him peculiar pleasure to put it on to his good friend Mr. Harley if he were elected.

MR. F. K. NEATH, B.Sc.

(Joint Honorary Convention Secretary and Conference Treasurer).

Mr. Neath is a member of the staff of the British Cast Iron Research Association, having been appointed in 1923 to take charge of the technical library and information bureau. He has been editor of the quarterly Bulletin from its inception, and is now responsible for the Association's development department, which deals with the application of the results of research work to works practice, and for the contact with members regarding foundry problems. He was one of the organisers of the two very successful visits to Germany by members of the Association in 1925 and 1927, and was organising secretary of the Technical and Education Exhibits at the International Foundry Trades Exhibition in 1929. He has been hon. secretary of the Birmingham, Coventry and West Midlands Branch of the Institute of British Foundrymen since 1926 and hon. treasurer since 1928. He is also a co-opted member of the Institute's Technical Committee and Sub-Committee on Cast Iron. He was educated at King Edward VI's School, Nuneaton, and took a degree in metallurgy, under Prof. T. Turner, at the University of Birmingham in 1922.

MR. F. J. COOK (Past-President), seconding, said that at a gathering of foundrymen there was no need to laud the virtues of Mr. Harley. It was sufficient to say that, in honouring him, they were honouring themselves.

Mr. Harley was elected, amid loud applause, which was renewed as Mr. Wilson invested him with the Chain of Office.

MR. HARLEY, having formally occupied the Presidential Chair, voiced his pride in the honour conferred upon him, though he admitted that he had looked forward to this ceremony with a good deal of misgiving; the duties of President of the Institute were becoming many and varied, and he hoped he had the qualifications necessary for carrying them out in a proper manner. It was a great help, however, to know that he had the confidence of the members and the assistance of the very large group of active Past-Presidents and the Institute's invaluable secretary, Mr. Makemson. He recalled that he had been a member of the Institute for 21 years, and said it was an interesting coincidence that he should have been honoured by his election to the Presidency during this particular year.

After commenting humorously upon Mr. Wilson's remarks concerning Scotsmen, he returned thanks for the kind things which had been said of him, and expressed the hope that he would be able to preside over the activities of the Institute with a success approaching in some measure that achieved by Mr. Wilson.

Presentation of Past-President's Medal.

The PRESIDENT, presenting to Mr. Wilson the Medal which it is the practice to present to all Presidents on their retirement, in recognition of their services to the Institute, said that the members were unanimous in recognising that Mr. Wilson had carried out the duties of the office in a very able manner indeed. (Hear, hear.) When Mr. Wilson was nominated for election as Junior Vice-President he had been surprised that his name had been put forward, but after a good deal of persuasion he had accepted the office, and the Institute had been fortunate in obtaining his services as Vice-President and later as President. He asked Mr. Wilson to accept the Medal as a token of the members' high regard for him; they were indebted to him not only for the distinguished manner in which he had presided over the Institute's activities, but honoured him also for his personal qualities, which had endeared him to all.

The Medal was presented, amid applause, and the President said he hoped Mr. Wilson would regard the whole of the members as his personal friends, and also that the Institute would have the benefit of his wise counsel in the future as in the past.

MR. WILSON, responding, agreed that he had been surprised when it had been suggested that he should take office, and added that he had felt very conscious of his disqualifications. But his term of office had been very pleasurable; he had had opportunities of meeting a great many of the members at the Branches and at the Institute's annual meetings, and had received very great kindness at their hands. He assured Mr. Harley that if he also derived as much pleasure from the Presidential duties he would not regret having been called to such an important office. Mr. Wilson also took the opportunity to pay a tribute to and thank the Institute's Secretary, Mr. Makemson, for the great help he had rendered during the past year. Mr. Makemson's thoroughness and capacity for work was astonishing, and, although those who had not occupied the Presidential office had not such good opportunities of appreciating Mr. Makemson's work, they all approved it.

Election of Senior Vice-President.

The PRESIDENT proposed the election of Mr. Victor Stobie, the Junior Vice-President, to the office of Senior Vice-President for the ensuing year. He paid a tribute to Mr. Stobie for his work as Junior Vice-President, and looked for-

ward to further great assistance from him during the coming year.

The resolution was seconded by MR. A. CAMPION, and was carried unanimously.

MR. STOBIE, responding, said it was indeed a pleasure to realise how well his nomination had been received. He recalled that his duties as Junior Vice-President had commenced at Middlesbrough; the Branch in that town was an offshoot of the Newcastle Branch, with which he was connected, and it was very pleasing to know that one's children had housed one when going forward. He was also gratified that he should have been elected Senior Vice-President whilst in Birmingham, the town of his birth.

Election of Junior Vice-President.

MR. R. J. RICHARDSON proposed that Mr. C. E. Williams, of Cardiff, be elected Junior Vice-President. Mr. Williams, he said, had served on the General Council for a number of years, and would be a very able Vice-President.

The resolution was seconded by MR. J. S. G. PRIMROSE, and carried unanimously.

The PRESIDENT, after commenting upon the importance of this election, because, in the ordinary course of events, the Vice-Presidents ultimately were elected Presidents, paid a tribute to Mr. Williams, and expressed the conviction that he would carry out the duties of the office in an excellent manner. It was hoped, he added, that Mr. Williams' election would result in a great expansion of the Institute's activities in the important South Wales district.

Election of Honorary Treasurer.

MR. F. P. WILSON, J.P. (Past-President), proposed the re-election of Mr. W. B. Lake (Past-President of the London Branch) as Hon. Treasurer of the Institute. Mr. Lake, he said, did not regard his job as one which could be run for him by a secretary, but was very keenly concerned personally with the finances of the Institute; its financial affairs were in very capable hands if he remained in charge of them.

MR. F. W. FINCH, seconding, said that the post of Hon. Treasurer was no sinecure when he had held it, and that remark was even more true to-day.

Mr. Lake was unanimously re-elected.

In returning thanks for his re-election, MR. LAKE said that when he had first been elected to this post he had not understood why more experienced members of the Institute had refused it, but he had come to understand the situation. But, having put his hand to the plough, and in view of the fact that the members had reasserted their confidence in him, he would continue to do his best during the coming year in the interests of the Institute.

Trustees.

On the motion of MR. A. CAMPION, seconded by MR. COLIN GRESTY, the Trustees of the Institute were unanimously re-elected. They are Mr. F. J. Cook, Mr. R. O. Patterson and Mr. Oliver Stubbs.

Auditors.

On the motion of MR. S. H. RUSSELL (Past-President), seconded by MR. FLAVELL, Messrs. J. & A. W. Sully & Company (chartered accountants) were reappointed auditors for the ensuing year.

Members of Council.

MR. HARPER announced that, as the result of the ballot for the election of five members of the General Council, the following were elected:—Messrs. A. Firth, E. Longden, H. Pemberton, H. Winterton and D. H. Wood.

The British Cast Iron Research Association.

MR. J. T. GOODWIN, M.B.E. (Past-President), proposed the following resolution:—

"The Institute of British Foundrymen, assembled in General Meeting, draws the attention of all founders to the value, both economic and technical, to the industry of the work of the British Cast Iron Research Association. In view of the immediate necessity for the Association to double its present income from the industry in order to qualify for the same Government grant, the Institute strongly recommends and urges all foundry proprietors to support it as ordinary members."

It must be borne in mind, he said, that the Association was the offspring of the Institute, and it was up to them to do their best to support it in the present circumstances. The Privy Council had decided that in future the subscriptions from the industry must be increased if the Association desired further Government support. The Government had shared the expense on a 50/50 basis for a long period, and after that it had supported the work by contributing a smaller percentage; it pointed out that it had placed the Association on its feet, and that, as in the case of other similar bodies, this Association must get more support from the industry. By letters and comments which founders had made to the Association they had indicated their appreciation of the advantages accruing from its work, and Mr. Goodwin felt sure that they would continue their support on a more liberal basis and endeavour to secure more members, in order to ensure the continuance of the research work.

MR. J. CAMERON (Past-President), seconding, said that the Association was overcoming many difficulties, and in his opinion it was essential that every up-to-date foundryman should take advantage of what it had to offer. It had a splendid staff, and deserved the very heartiest support.

MR. W. B. LAKE, J.P. (Hon. Treasurer), supported the resolution.

MR. W. JOLLEY, speaking as a Convener of the Institute's Technical Committee, also supported the resolution. The Technical Committee, he said, had to do the groundwork and prepare schemes, and he had the assurance of the Directors of the Research Association that they would support any effort made by the Technical Committee.

The PRESIDENT, who endorsed the remarks made, said that the curtailment of the activities of the Research Association would be disastrous to the cast-iron industry. He added that a great many of the industry's problems, and particularly those before the Institute's Technical Committee, would be simplified if every founder were a member of the Research Association; that was an ideal which the Institute would work for. The research work must continue, for his own feeling was that so far we were only at the beginning of the research necessary on cast iron, and everything possible must be done to strengthen the hands of those engaged in the work.

MR. SMITH suggested that the resolution did not go far enough, but that a committee should be formed to consider the matter thoroughly in order to help the Research Association in a more practical way.

The PRESIDENT agreed with Mr. Smith that everything possible should be done, but suggested that at this stage the propaganda work and the establishment of closer relations between the industry and the Association, so far as the Institute could help, might best be left in the hands of the Institute's Technical Committee.

The resolution was carried.

Foundry Exhibition and Congress at Milan.

DR. ING. G. VANZETTI (the son of Commendatori Vanzetti, C.B.E., who was President of the International Committee last year) conveyed personally to the Institute the best wishes and friendly greetings from Italian foundrymen, and made an appeal for support of the International Foundry Exhibition and Congress, to be held in Milan in September this year. He pointed out that Italy, in common with other countries, was experiencing great difficulties industrially, and that, under such circumstances, it was specially difficult to organise an international exhibition. If industrialists believed in exhibiting their products at times when the works were full of orders and when their shops were producing to 100 per cent. of their capacity, was it not all the more necessary, at times such as the present, to show what they could produce? He realised that all were endeavouring to economise, and were "feinting for the next hold," but this was the time when sound firms could be distinguished from the weaker, and it was the time when the strongest would rise to the top. Again, it was a time when cheap products were holding the market more than the high-quality products, and British industrialists must look for new markets in order to maintain their position by showing the great field of usefulness of the high-quality products for which Britain was noted. For this reason the organisers of the exhibition hoped and believed that advantages would accrue from exhibiting in Milan. The Italian foundrymen would welcome British foundrymen with open arms.

At the President's suggestion, the general secretary of the Institute was instructed to send a special message of encouragement to the Italian Foundrymen's Association, expressing best wishes for their success in connection with the International Exhibition and Congress, and pledging support.

Vote of Thanks to Officers and Council.

On the motion of MR. MILES, seconded by MR. JOHN SHAW, a hearty vote of thanks was accorded the President and his fellow-officers, and the members of Council, for their work on behalf of the Institute during the past year.

Obituary.

The PRESIDENT mentioned that during the past year the Institute had lost one of its founder members, Mr. James Ellis, who was also a Past-President. Mr. Ellis had attended many conventions, and in Middlesbrough in 1930 he had been presented with the Oliver Stubbs Gold Medal. The members would feel a certain measure of satisfaction in having had the opportunity to confer this well-deserved honour upon Mr. Ellis at that time.

Another prominent member who had passed away during the year was Mr. W. H. Poole, who was a valuable contributor to the discussions at the Institute's conventions, and had rendered very good service, especially to some of the northern Branches, such as the Lancashire Branch. Mr. Poole had been a member of the metallurgical staff of the Daimler Company in his younger days, so that by his death very many Coventry people had suffered personal loss.

Mr. Stubbs' Illness.

The PRESIDENT also expressed sympathy for Mr. Oliver Stubbs, a Past-President, and the originator of the gold medal which bears his name. Though Mr. Stubbs was unable to attend the convention, owing to illness, his heart and soul were in the Institute's deliberations, and the members would wish to convey their good wishes to him and to thank him again for the distinguished services he had rendered in the past.

The meeting resolved that this expression of sympathy and good wishes be conveyed to Mr. Stubbs.

PRESIDENTIAL ADDRESS.

In the course of his address MR. HARLEY said: Mr. Wilson and Gentlemen—Before proceeding with my address, I should like to offer a cordial welcome to all the delegates, and to express the hope that your visit to the Midlands may prove beneficial in every way.

I do not think that anyone can question the value of these Conventions. Apart from the fact that we must meet to transact the business of the Institute, we have the privilege of listening to discourses by experts on a variety of subjects of great importance. Opportunities are also given for members to visit foundries en-

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gaged on widely different lines of work, and to see methods of production which may be new.

This is by no means all. The foundry industry in every part of the country is represented in our gathering, and we have also representatives from Research Associations, Technical Colleges and suppliers of foundry equipment and raw materials. This gives a wonderful opportunity for the informal exchange of ideas on all branches of its activities. Our social functions help to cement the bonds of friendship, and I feel certain that everyone returns to their duty, not only richer in ideas but with fresh inspiration to carry on what is a very difficult and responsible occupation.

Finance and Technical Progress.

We are all familiar with the old maxim that "necessity is the mother of invention," and I have heard it said that "depression is the father." Anyhow, the necessities of the present situation are such that the whole structure of industry and commerce is being closely scrutinised. There are indications that this critical spirit is being applied to our own Institute. It is a healthy sign. Our activities are extending in new directions, and it is imperative for the well-being of the industry that our schemes should operate effectively. We must be prepared to adapt and modify our organisation, if thereby we can make it a more efficient instrument.

It is not my intention to review all the affairs of the Institute. The Annual Report will repay careful study, for therein we have a clear statement of our financial position, and a very able summary of our various activities. There are, however, certain matters of primary importance to which I should like to draw your attention.

To begin with, there is the membership question. Our problem is the retention of our members. We know there must be inevitable losses, and it is, perhaps, a matter for congratulation that in these hard times we can show a net increase. Nevertheless, I wonder sometimes if the high proportion of losses points to some defect in our organisation. We seem to have reached the stage when this leakage must be dealt with. Indeed, there are several aspects of this membership question which require careful examination, but I trust that whatever is done we shall not lose our democratic character.

I am not worrying very much about abstruse questions of status. It is our annual income about which I am concerned, because some of our most promising plans may be rendered futile for lack of money.

A Wider Base Needed.

We desire the co-operation of the whole foundry trade in our work, and appeal particularly for the sympathetic interest of all foundry employers. We want them to realise that the work of this Institute will have a profound influence for good on the future of the industry. It is, therefore, very desirable that in their own interest every encouragement should be given to employees to become members.

The question may be asked: What is the ultimate object of all our activities? The answer is, that we assist and encourage our members to become efficient foundrymen. It is our aim to raise the character and quality of the whole foundry personnel. The first great step in this direction has been the establishment of our certificate schemes. The foundation work is now complete, and on your behalf I would express our feeling of deep obligation to those who have laboured to bring our plans to their present stage. The work has been carried out with great care and ability. The schemes are to be put into operation during the coming winter. The next few months are, therefore, critical, and it is rightly realised that we require now an active publicity campaign.

Recruitment of Personnel.

The great initial difficulty is that in many localities there are not sufficient boys coming into the industry to make our schemes workable. The publicity campaign, therefore, must have as its objective the parents and the apathetic employer. The local education authorities are ready and willing to co-operate in every way, but it is obvious that they cannot make proper arrangements for new classes unless an adequate number of boys are available. The active co-operation of the employer is essential for the solution of this problem.

One of the most satisfactory developments of recent years is the close interest taken by suppliers of foundry material and equipment, not only in the business affairs of the Institute, but also in the technical problems of production. In both these respects we welcome their co-operation and assistance. The more our suppliers understand the technical side of foundry work, the more likely are they to provide what we want. Of course, one sometimes gets the impression that they know what we want better than we do ourselves. This is known as salesmanship.

Simplification by Specification.

Speaking of foundry raw materials, most progressive firms have their own set of specifications. It would be a useful piece of work for our Technical Committee to establish standard specifications for all important foundry materials. This could naturally follow on the work now in hand of collecting and classifying the existing specifications dealing with cast materials.

MR. F. H. HURREN

(Joint Honorary Convention Secretary).

Mr. Hurren, who joined the Institute of British Foundrymen in 1907, is a director of the Coventry Malleable Company. Previous to this he was foundry manager and chief metallurgist to the Rover Company. Mr. Hurren has read many Papers before various Branches of the Institute, usually dealing with some phase of the metallurgy of malleable cast iron, of which subject he is a recognised specialist.

I am hoping, too, that the time has arrived when users can rely on materials being delivered to specification. Why should it be necessary for two sets of analysts to be testing the same material? Our foundry chemists would be able to concentrate their attention on checking-up our castings to ensure delivery to the specifications imposed on the founder. Incidentally, more direct means could be adopted for the handling of material from the truck to the furnaces.

In the region of technical science, the advance seems to have accelerated in recent years, and it is difficult for the ordinary foundry official to keep abreast of all that is going on. If our Technical Committee can do anything to summarise the results of research, they will confer a boon to many harassed foundry managers. The gentlemen who write technical Papers can also help by stating their conclusions in a clear and concise manner. Complicated graphs may be necessary, but the average foundryman turns from them like an Englishman from porridge.

The proper classification and tabulation of technical research is important for another reason. There is a vast amount of duplication and repetition in experimental work, and a lot of money is wasted on finding out things that are already known, although not to the individual concerned.

And now, gentlemen, having dealt with some of the more domestic affairs of our Institute, perhaps I ought to say something about certain aspects of industry in general, and of our foundry trade in particular, on the prosperity of which our welfare as an Institute depends.

The immediate future is so bound up with the economics of industry that I may be forgiven if I mention some of our special difficulties—not too seriously—not too querulously—but rather as a reminder that we in the foundry trade are pulling our weight in the struggle for renewed prosperity.

"Passing the Baby."

The average foundry, unfortunately for its economic well-being, is not advantageously placed for the modern game of "passing on the baby." I am not complaining, for I appreciate only too well the difficulties in which manufacturers find themselves.

But let me illustrate the point. Owing to intensive competition, and the habit of fixing selling price before costing, the manufacturing cost of a certain machine or article must be reduced by 25 per cent. in order to show a profit. The manufacturer himself does what he can to reduce his own internal costs, but it is on raw materials and bought components that he depends mainly for the necessary saving. So the game begins—all along the line the baby is passed, until it arrives at anxious, if not too affectionate arms, where, since passing is no longer possible, the baby must be held and nursed. It is to this category that the foundry largely belongs, and we take some pride in the fact that we have not only "held the baby," but we have helped to keep it nourished. Moreover, by meeting the demand for narrower machining allowances, we have helped towards increased economies in the machine shop and after-processes.

Meeting Modern Conditions.

It has been assumed in some quarters that British firms could, with advantage, reduce the quality and finish of their manufactures. My own experience has been rather contrary to this idea, for the very economic causes which have brought about the fall in prices, have also, of necessity, led to a better quality of casting, more rigid dimensional specifications and keener inspection.

This reduction in machining allowances has been most notable in the development of die castings in light alloys. The alloys themselves are receiving considerable attention, both in the direction of reduced specific gravity and lower coefficient of expansion. The foundryman has now to pay increased attention to the heat-treatment of his castings, especially so in light alloys—and even in cast irons.

All this entails the installation and working of plant not hitherto considered part of a foundry lay-out; an increased appreciation of temperature control within fine limits, in both melting and after treatment. Demands for special cast irons are increasing year by year, and the day is not far distant when a full range of heat-treatable cast irons will form part of our normal specifications. The importance of the foundry in the engineering world is greater than ever it was, and we may be fully assured that there will be no decrease in our anxieties and difficulties.

Two Cardinal Mistakes by Designers.

I must not anticipate the Paper by Mr. Pomeroy, but the opinion may be expressed that the foundryman still suffers from the optimism of the designer in regard to the production of complex shapes and from his pessimism in regard to the strength of cast materials. Undoubted progress has been made, but a too rigid dependence on test-pieces is responsible for a somewhat academic attitude which is not always supported by actual practice. The stresses obtained in service are usually complex in nature, and cannot be imitated by any one static test, and factors of safety based on such a test may be quite misleading.

Research on the fatigue properties of metals and alloys warrants more attention. This is all the more important now that sections are being reduced in the ever-growing demand for lightness. Metallurgists and engineers alike should strive to understand the stresses which come on to a component in use. (The foundryman has his work cut out to avoid the creation of latent stresses in the process of casting.) Static tests should be placed in their proper category as indicating the correspondence of the metal to a physical and chemical specification. Necessary as test-pieces are, it is possible to have a test-piece complex, and to think work well done when it has received the Pontifical blessing and passed on to an inspection paradise.

The increasing use of engineering equipment has led to some confusion of thought among our modern efficiency theorists. Much is said about the desirability of eliminating the human element, when what is actually meant is the elimination of human physical effort. The human element cannot be eliminated, especially in a foundry, although the onus of thought and judgment may be passing to some extent from the operative to the administrative and technical staff.

Mechanisation and Human Element.

We cannot afford to eliminate the necessity for observation and deduction on the part of anyone, even in the most routine of our foundry processes. These are the first steps towards correct manipulation, and the men on the foundry floor should see most of what happens on the foundry floor. The more rigid the technical control the greater the breakage when that control fails through not taking into account the human element. The whole of our foundry personnel must be directed, educated and utilised to advantage. True efficiency must include the checking, not only of our instruments, but of the men who use them. Any indications of natural aptitude should be watched for and opportunities given for development. Every grade should be encouraged to take an interest in their work. Genius is not the prerogative of the trained man. Moreover, we might do something to recover that unity of effort—that team spirit—which is now so lamentably absent.

The Future.

And what of the foundry of the future? It will be a cleaner and healthier place than the foundries of our youth, and, as such, will again attract our boys, who for a time have preferred the mental tranquility of the machine shop or the dubious attractions of the office. In one respect the foundry of the future will be no different. New alloys will be discovered, presenting new casting and moulding difficulties, and the foundry manager will still suffer from premature—greyness.

Electrical melting will inevitably increase as the cost of current decreases. We may live to see the all-electric foundry. Permanent moulds will be used more and more. Examination by X-rays will enable us to see at once that the casting is a bad one, and so shorten the period of palpitating uncertainty.

Craftsmanship to be Perpetual.

But, like Cleopatra, "age cannot wither nor custom stale, the infinite variety" of our daily round. It may be a foundry of electric furnaces and mechanical conveyors, but even then craftsmen will be required. The making of patterns, the design of permanent moulds, jobbing and loam work, precise knowledge of running castings—all this and much more will call for craftsmanship of the highest order, and it will be many years before the last cupola is installed in the South Kensington Museum. Specialisation of foundries according to type of metal will, no doubt, be further developed, but with all these improvements the making of castings will still be a manufacturing process containing enough problems to last the lifetime of the youngest of us.

The production economies forced on us, in common with all trades, are mainly to the good, and we can only hope that the efforts of the producing community will be emulated in national administration and finance. The production side of industry may well demand equal effort and equal sacrifice in all departments of our national life.

This continual call for cheaper production must have a limit. When all is said and done, we have reached a high level of attainment in the production of commodities, and if we are still allowed to exercise our individual initiative and natural enterprise, this level will keep going up. What has to be improved is the technique of distributing commodities, so that underconsumption and unemployment may be avoided. This is the greatest problem to-day, and it is imperative that all civilised nations should bend themselves to the task of solving it.

Vote of Thanks.

Mr. F. P. Wilson, J.P. (Past-President), expressed the heartiest appreciation of the President's very wise and far-sighted address, and proposed a vote of thanks to him.

Mr. F. J. Hemming (President, Birmingham, Coventry and West Midlands Branch) seconded.

The vote of thanks was accorded with acclamation, and the Chairman briefly responded.

The presentation and discussion of Papers was then proceeded with.

THURSDAY, JUNE 11.

On Thursday morning, June 11, the members and ladies journeyed by motor-coach to Coventry, and assembled at St. Mary's Hall, a building more than 400 years old, built of the local red sandstone, and containing some very fine carvings and stained-glass windows. Here they were welcomed heartily by His Worship the Mayor of Coventry (Alderman W. H. Batchelor).

The City of Coventry.

In the course of his address of welcome, The Mayor made some interesting references to the city of Coventry, of which, he said, its citizens were very proud. During the last 25 years it had extended very much. Since he had become a member of the Council, the population of Coventry had increased from less than 60,000 to 170,000 or more, and that development was due in great measure to the adaptability of the industrialists and the workpeople there to the altering circumstances and the opportunities. It had been concerned with the manufacture of ribbons, silk, watches, bicycles, etc., and finally, motor-cars, and, he said, it was still holding its own, producing the best motors in the world. Coventry's industries had attracted to the city a great number of people, from all over the country. There had been attracted men of character, ability and enterprise, and as a result there would grow up a really good race of artisans and of men capable of taking charge of industries; they would not only help to develop Coventry, but would make their mark also in other parts of the country. Those who had been attracted to the city included Mr. Andrew Harley, the Institute's President. (Applause.) No doubt he had come to benefit himself in the first instance, but he had remained to benefit the city. (Hear, hear.) He controlled one of the largest foundries and one of the best chemical laboratories in Coventry.

Coventry was proud not only of its industries, but also of its Employers' Federation, whose members were very sympathetic towards their employees. They were anxious to further the interests of the employees, and they co-operated with the education authorities in a very thorough manner. There had been established a system of apprenticeship and training which he believed was an example to the rest of the country; at any rate, the Board of Education held it to be an example to others. The city authorities were glad to be able to co-operate with the industrial leaders to benefit industry, and they were doing it. There were difficulties, of course, but they were being overcome. For example, the city had been given a building in which to give technical training; it had been used as a technical college for a long time, but the needs had outgrown the accommodation there, and the erection of a new technical college was about to be commenced. He believed that its equipment would be such as to give every gratification to the industrial leaders of Coventry. He felt sure that the provision of proper training for those who were to enter the foundry trades would be given its due consideration. In the works which the members of the Institute would visit in Coventry that day they would find absolutely up-to-date foundries, equipped with the most modern appliances, and in buildings which were a credit to the industry. In the old days it had been considered that any old shed would do for a foundry, but that view was no longer held. Young men would not be attracted to-day to work under conditions such as those which existed 40 years ago; they wanted better conditions, and it was only fair that they should. Those responsible for the industry realised that, and were erecting their foundries and equipping them in such a way that they would attract intelligent youths.

Finally, in wishing success to the conference and commenting upon its value, he said that those attending benefited not only by the reading and discussion of good Papers, but also by rubbing shoulders with their fellows. Informal discussions between men of similar interests were of the greatest possible value.

Vote of Thanks to Mayor.

A hearty vote of thanks was accorded the Mayor for the sincere welcome he had extended to the visitors. It was proposed by Mr. Victor Stobie (Vice-President), and seconded by Mr. F. P. Wilson, J.P. (Past-President), both of whom commented upon the privilege, which the visitors appreciated, of being able to meet in a really magnificent building, and assured the Mayor that they would carry away with them very happy memories of the reception accorded them in Coventry.

The Mayor briefly responded, and in the course of his remarks he again expressed the hope that the conference would be profitable to all attending it.

The Mayor had to leave at this stage, in order to attend an important peace conference, and on behalf of the visitors the President expressed the hope that it would be most successful, seeing that its object was the noblest that any man or woman could aim at.

The ladies also left the hall in order to visit some of the historic places in Coventry. Meanwhile the members of the Institute devoted their attention to the discussion of Papers.

Luncheon.

The members and ladies and other visitors were entertained to luncheon on Thursday by the Birmingham, Coventry and West Midlands Branch of the Institute, at the Masonic Hall, Coventry.

At this luncheon a toast to the City of Coventry was proposed by Sir Edward M. Iliffe, K.B.E., appropriately, for he was born in

(*Concluded on page* 424.)

Twenty-One Years' Sterling Work Recognised.

SCOTTISH FOUNDERS' CIVIC RECEPTION.

Formation of the Scottish Branch of the Institute of British Foundrymen.

The Scottish Branch of the Institute of British Foundrymen, or, as it was then known, the British Foundrymen's Association, was formed on February 16, 1910, at a meeting, held in the Royal Technical College, Glasgow, which was convened by Mr. A. Campion, who was then conducting foundry classes in the college. The students, together with a number of persons connected with the industry, who had been invited to be present, decided that it was desirable that a Branch of the Association for Glasgow and the West of Scotland be formed, and appointed a committee to arrange an inaugural meeting. Mr. John King, a prominent ironfounder and an ex-Bailie of the City, was appointed President, with Mr. William Mayer and Mr. A. Campion as Vice-Presidents.

On April 15, 1910, Mr. Robert Buchanan, the Association's first President, delivered the first Paper to the Branch. Later, two of the Branch's first office-bearers—Mr. Mayer, a Vice-President, and Mr. M. Riddell, a member of the council—became Presidents of the Institute, the latter at the period when the Royal Charter was granted.

The Branch progressed steadily, and, in 1913, the council decided to institute Sections in Falkirk and Paisley for session 1914-15. Arrangements had been made for the Falkirk Section, when the military authorities prohibited the holding of meetings in that town. The Section was, however, started in 1919. The Paisley Section functioned successfully until two years ago, when, owing to the closing of the principal foundries in the district, and the proximity of Paisley to Glasgow, it was suspended until the industry became more prosperous. The Scottish Council are now considering the commencement of a Section in Edinburgh and district, to serve Eastern Scotland.

To mark the completion of the Branch's twenty-one years' work, the Council decided to hold an intensive campaign for the increase of membership in Scotland, and the assistance of the Corporation of Glasgow was sought in giving publicity to the work of the Institute. The suggestion that civic recognition be given the Branch was readily accepted, with the result that the Lord Provost and Corporation of the City invited the members and friends to a Civic Reception held in the City Chambers. About 600 atended.

The Branch's Achievements.

In welcoming the guests, the Right Hon. THE LORD PROVOST (Mr. Thomas Kelly) said that the Institute of British Foundrymen, formerly known as the British Foundrymen's Association and founded in Birmingham in 1904, was the only organisation in the British Isles which catered for the mutual exchange of opinion relating to the technical aspects of the industry. Its objects were to provide means of advancing knowledge of foundry practice in its widest sense, and afford means of communication between those engaged in the foundry trades. From the outset these objects had been purely educational; commercial matters and the relations between employer and employee had always been outside its scope. The importance of the Institute's work was officially recognised by the granting of a Royal Charter in 1921.

One of the earliest activities of the Scottish Branch was to invite the Institute to hold its annual conference in Glasgow in 1911, when the Corporation extended hospitality to attending members. At that time the Lord Provost was a prominent ironfounder, Sir Archibald McInnes Shaw. The close relations then established between the Institute and the City had been maintained to this day. The Corporation entertained the members during two subsequent conferences in 1921 and 1925, while in 1929 a large party of overseas foundrymen, attending the International Foundry Congress, whilst guests of the Scottish Branch were received and welcomed in the Council Chambers.

At the time the Branch was started, the Diesel engine was in its infancy, and engineers experienced great difficulty in obtaining castings to withstand the severe conditions. It was largely due to work performed in Glasgow by certain members of the Scottish Branch that a cast iron was produced which withstood the conditions of service. The results of this work formed the basis of all subsequent Diesel metals.

The Branch had always worked in close co-operation with other local technical societies. In 1924 a series of meetings was held in conjunction with the Institution of Mechanical Engineers, when a symposium on Diesel-engine castings was arranged. Two years ago another series of meetings was held with the same Institution for the discussion of the steel-casting problem as applicable to marine purposes. The Engineer-in-Chief of the Admiralty showed his interest in this symposium by sending a representative to postulate the requirements of the Admiralty, and the authorities at Woolwich allowed Dr. Pullen to explain the method of testing steel castings by means of X-rays.

During the past twenty-one years, said the Lord Provost, the Scottish Branch had done much towards the improvement of the foundry trade, and indirectly for the engineering and allied trades. It was confidently anticipated that the Scottish Branch would achieve much greater things in the future.

The Branch-President's Reply.

MR. JAMES MILLER (Branch-President), in reply, said that his first duty was to express the sincere thanks of the members of the Scottish Branch and of the General Council of the Institute for the cordial welcome which the Lord Provost had given them. Also, he offered to the Lord Provost, the magistrates and the Corporation of the City of Glasgow, the thanks of the members and their friends for the hospitality which had been extended to them.

Twenty-one years was not a long while in the life of a technical society such as the Institute, and, although it was comparatively young, it was a matter of pleasure to members that the older societies had taken them so kindly and that the joint meetings to which the Lord Provost referred had been so successful in helping to find solutions to some of the difficulties which were met with in the march towards greater technical efficiency.

The motto of the Institute was "Science hand in hand with Labour," and they tried to live up to that motto by remembering that industrial efficiency could only be obtained by the sometimes painful process of putting into practice, in their foundries, the results of researches by metallurgists and engineers. In that way would be found the industrial salvation of the country, and as the Institute's membership included craftsmen and operatives as well as directors and managers, perhaps the reason for the success it had achieved was not so difficult to find.

Members of the Scottish Branch had been responsible for the production of a high-class iron suitable for the Diesel engine, and it was extremely gratifying that, in connection with the building of the Cunarder at Clydebank, at least 1,000 tons of castings were being made in Glasgow.

Messages of Congratulation from Overseas.

The Lord Provost had referred to the welcome given in the Council Chamber in 1929 to overseas friends. The Branch-Secretary (Mr. J. Bell) had a letter from Mr. Sam T. Johnston, of Chicago, who had headed that overseas delegation. In it he said: "I have been advised that you are celebrating your twenty-first anniversary, and that the Institute of British Foundrymen are holding their Spring Meeting with you in Glasgow. As a former President of the American Foundrymen's Association, and at present a Director, I send you my heartiest greetings and hope you will have a splendid meeting, worthy of the occasion. As a native of Glasgow, I am particularly interested in your affairs, and all the more so as I had the great honour of heading the delegation of the American foundrymen who attended the International Congress in Britain in 1929. Our members still speak of the happy time we had on the trip down the Clyde, and also the motor trip to Edinburgh by way of the Trossachs. All Scotsmen in the States, connected with the foundry industry, have a very friendly feeling to your group, and follow with interest the reports of your meetings and work. It is my great pleasure to send the Scottish Branch my heartiest greetings and an expression of my good wishes for your success."

The President and secretary of the American Foundrymen's Association had sent a message as follows:—

"The American Foundrymen's Association notes with pleasure that the Scottish Branch of the Institute of British Foundrymen is celebrating its twenty-first anniversary, and that, in honour of the occasion, the Institute is holding its Spring Meeting in the city of Glasgow.

"As in the past, all branches of the foundry trades have benefited by the intelligence and industry of Scottish scientists, metallurgists and foundry directors, so in the future we may expect much help from them in solving our common problems.

"The graceful recognition given you by the Corporation of the City of Glasgow is well merited, and we join them in expressing our appreciation of your splendid work. Accept our heartiest felicitations on attaining your majority, and wishing you continued success, we are,

"NATHANIEL K. B. PATCH, President.
"C. E. HOYT, Secretary."

A letter had also been received from Mr. Robert Crawford and the Detroit Foundrymen's Association, as follows:—"I notice that you will complete the twenty-first year of your existence on Friday, April 17. The experience of my trip and the friends I met is still a beautiful memory. In the midst of all the problems we all have to face at the present time, due to this world-wide depression, it calls for a leadership of a very high order. Please convey to your membership greetings from myself, personally, and also the Detroit Foundrymen's Association, Mr. James L. Mahon, President. I think the best message I could send to you is the quotation from Thomas Carlyle: 'Look not mournfully into the past, wisely improve the present, go forth and meet the future without fear but with manly hearts.'"

In again thanking the Lord Provost for the recognition he had given them, Mr. Miller expressed the belief that, as in the past, so in the future, the members might be depended upon to do all they could to uphold and advance the reputation of the city as a great industrial centre.

The Sir Archibald McInnes Shaw Prize.

The documents in connection with the Sir Archibald McInnes Shaw Prize were then handed to the Corporation of the City of Glasgow, as trustees of the fund, by MR. N. MCMANUS, M.B.E., President-Elect of the Scottish Branch, who said that we were faced with ever-increasing competition, and a demand for stronger, yet lighter, castings. This could only be met by increasing efficiency and making use of all scientific and technical knowledge as it became available. There were undoubted signs that the foundry,

like all other industries, was becoming more and more mechanised, which was a healthy sign for the future. One had to consider the personnel to deal with these changing conditions, and it was in this direction that the Institute was rendering valuable aid. He appealed to all foundrymen who were not members to join. It was to the youths in the industry that the future control and leadership would be entrusted. The citizens of Glasgow and district had always been very generous in their gifts to assist and encourage the training in the true sciences and arts, but the more practical sides had not been so fortunate. Therefore, the Scottish Branch, to celebrate its coming of age, and to give a lead in this direction, had invested a sum of money, in the name of the Glasgow Corporation, to provide prizes annually for boys attending foundry classes under their jurisdiction. The prizes were to be known as the Sir Archibald McInnes Shaw Prize. The reason for the title was explained by an excerpt from the letter accompanying the gift:—

"*Sir Archibald McInnes Shaw Prize.*—We have pleasure to enclose Certificate of Registration of the sum of £100, which has been invested in Registered Local Bonds of the County Council of Lanark in the name of The Corporation of the City of Glasgow, Trustees of the 'Sir Archibald McInnes Shaw Prize.' Our Branch Council are glad that the Corporation agreed to the suggestion to name the prize 'The Sir Archibald McInnes Shaw Prize.' In selecting this name the Council has sought to express its indebtedness to Sir Archibald for many services gladly and kindly rendered by him, and it is a matter for pleasure to our members that Sir Archibald consented to this name, and that the Corporation so readily agreed to this honour being shown to a Foundryman who, as Councillor, Magistrate and as Lord Provost, served the city with success and distinction."

On behalf of the Scottish Branch of the Institute of British Foundrymen, said Mr. Manus, he had much pleasure in asking The Lord Provost to accept the gift.

The Lord Provost replied that he had great pleasure in accepting the certificates on behalf of the Corporation of the City of Glasgow, and he assured the Branch that the trust would be faithfully administered.

Presentation to Mr. A. Campion.

Mr. F. P. Wilson, J.P., President of the Institute, said that he had had the honour to be asked to make a presentation to Mr. Campion in recognition of his services to the Scottish Branch. When the Scottish Branch was formed in 1910, Mr. Campion was engaged in teaching metallurgy in the Technical College, but he had the foresight to realise that something more that the ordinary technological teaching was necessary, so he interested himself in the formation of the Branch of the British Foundrymen's Association, as the Institute was then known. He had, during the last 21 years, maintained the tradition of the Institute, a tradition of faithful and devoted service without hope of reward. Mr. Campion had worked unceasingly on behalf of the Branch; he was the President during the difficult times at the outbreak of war, and he had been examiner for the Surtees competition when it had been held in Scotland. Mr. Campion had, too, given his help in the work of the national council and its committees.

The presentation to Mr. Campion consisted of a gold wristlet watch, and was given by the members of the Scottish Branch in appreciation of his services between 1910 and 1931. Mr. Wilson had the greatest pleasure in handing it to Mr. Campion, and in wishing that he might long be spared to continue his good work.

Mr. Campion's Reply.

Mr. A. Campion said that it was indeed kind of the members of the Scottish Branch to present him with the watch in recognition of his work in connection with the Institute since its formation. He thanked them most sincerely for their kindness and generosity and also thanked Mr. Wilson for the very kind and appreciative things he had said. The twenty-one years which had elapsed since the Branch was formed had been very happy ones so far as he was concerned. The fact that the Branch had prospered and had been able to help in the progress of the industry, and the good friendships which he had made, were sufficient reward for anything which he had been able to perform on behalf of the Branch. He could not help recalling the first meeting held in 1910. It was pleasing to know that a few of those who had attended it were present that evening.

The Scottish Branch had taken a full share of the work of the Institute in all that it had done for the advancement of the industry. The activities of the Branch were, as they had heard from the President, well known and appreciated not only within the British Isles but overseas, and it was pleasant to receive from those who visited them two years ago letters of congratulation and appreciation. He would like to mention that they had also received telegrams of congratulation from the various Branches.

At the conclusion of the speeches the members engaged in dancing or attended a concert held in the council hall. It would be ungracious to omit from any account of the functions in connection with the celebrations, or of the progress of the Branch during the past eight years, the untiring efforts of the Branch secretary, Mr. John Bell. The success of the many functions and meetings in connection with the Institute in Scotland has been due, in large measure, to the very enthusiastic and thorough manner in which Mr. Bell has performed his duties.

It is satisfactory to note that as a result of the publicity due to the civic reception, a considerable number of applications for membership has already been received.

Institute of British Foundrymen.

(*Concluded from page* 422.)

Coventry and has business and other associations there. After references to Coventry's civic and commercial development, in the course of which he said that Coventry had had many commercial reverses during the eighties of last century but had always come out on top, Sir Edward went on to refer to the present world trade depression. The whole world, he said, was taking a buying holiday, and, as that happened to coincide with increased production, the crisis was acute. On the whole, he did not think Coventry was suffering to the same extent as many other manufacturing centres. Our forefathers had possessed great competence, energy and initiative, and he did not think the existing manufacturers in Coventry lacked such qualities. He was convinced that Coventry would be one of the first cities to recover when trade again began to flow. That flow would not occur, however, until the Government of the day was willing to face the situation as business men had to face difficulties. When the latter experienced bad times they had to cut their expenditure to keep it within their revenue, or the result was bankruptcy, and that applied also to the State. Provided our manufacturers were given a fair chance, especially in overseas markets, he felt perfectly certain that prosperity would soon return.

Councillor G. E. Roberts, whose name was coupled with the toast, responded. He conveyed to the gathering the Mayor's regret that he could not attend, owing to a prior engagement. Councillor Roberts also took the opportunity to express appreciation, on behalf of the people of Coventry, of the honour which the Institute had conferred upon Mr. Harley by electing him President. Mr. Harley, he said, was a man of proved ability and one ready to give of his best to any deserving cause, and foundrymen in Coventry, no less than the citizens at large, were delighted that he had been honoured. He would add lustre to the Institute.

Among the features of Coventry to which Councillor Roberts referred was that of technical education facilities, and he said that at the new technical college there would be installed foundry equipment which would enable the youth of the city to gain a practical knowledge of foundry work. He added, amid laughter that if there were manufacturers of foundry equipment present who would like to make suggestions as to the plant to be installed at the college, their help would be gladly accepted.

Cinderella and Prince Charming.

Mr. L. H. Pomeroy (the managing director of the Daimler Company, Limited) proposed the toast of "The Institute of British Foundrymen," with which he coupled the name of its President. In the first place, he disobeyed the injunction made by the President, in the course of the discussion that morning, that the foundry should not be referred to as the Cinderella of the engineering industry, and pointed out that mention of the name of Cinderella implied the presence of a Prince Charming. What could be better than that? Continuing, he said that the Institute was one of those bodies, of which there were many in the country, and which did a great deal of useful work, but did not always gain the recognition they should for it from those concerned with the commercial administration of the industries so served. He added, amid laughter, that if any employers did not realise the tremendous amount of good work done by such bodies for the benefit of industry, we should not work for them.

The coupling of the name of the President with this toast gave him very great pleasure, for Mr. Harley was a valued colleague and a very esteemed friend of his. It was no small thing for any man who had followed a particular vocation throughout his life to become the acknowledged head of his profession, and to be acknowledged as such by his associates. Mr. Pomeroy congratulated the Institute upon having elected Mr. Harley as its President, and congratulated Mr. Harley upon the fact that his life's work in the industry and in the Institute had been so recognised.

The President, in his response, took the opportunity to thank Mr. Pomeroy for his invaluable help to him (Mr. Harley) personally, and also to the Institute by contributing an excellent Paper to its proceedings and by attending the convention. He also thanked the Daimler Company for having supported him on this occasion, and acknowledged that without that support he could not have carried out his duties as President as he wished to do. The founding industry, he said, owed much to the broad-minded and liberal attitude of automobile manufacturers. They had given opportunities for the development of foundry plants, which opportunities perhaps had not been given to other branches of the trade, and in so doing they had given evidence of the enlightenment which had made their industry so successful.

Finally, the President appealed to all who occupied positions of responsibility to cultivate to a greater extent the personal factor in industry, for it was perhaps neglected in many cases. Mr. Pomeroy was, perhaps, a unique example of a man having a gift of getting the best out of people, by stimulating their imagination, and by making them feel that they were definitely important factors in the industrial machine. Such personal contact and sympathy aroused enthusiasm and initiative which he believed was rather damped in many places, and he believed that if its value could be appreciated to the full it would be a most powerful factor in restoring British industry to the position it ought to occupy. He appealed to employers also to give the young men in their foundries every encouragement to join the Institute and to take advantage of the facilities it afforded for improving their knowledge.

XUM

Trade Talk.

THE WHESSOE FOUNDRY & ENGINEERING COMPANY, LIMITED, Darlington, have secured a contract for the construction of several large-capacity steel tanks at the Shell-Mex Oil Company's depôt at Fulham, London.

IN THE COURSE of a report to the Federation of British Industries by the President, the President-Elect, and the head of the Empire Section, on their return from Canada, May, 1931, it is remarked that the British Empire can exercise a deciding influence toward a sound world development which will make for the greater well-being of the world as a whole, but such a consummation is only possible provided all parts of the Empire work together.

THE FOWNES FORGE & ENGINEERING COMPANY (1928), LIMITED, Cardiff, has acquired the engineering firm of Barrett & Company (Cardiff), Limited. Messrs. Barretts will continue as a separate concern, but will be under the management of Mr. Brinley C. Davies, manager of the Fownes Forge & Engineering Company, thus combining two Cardiff firms which specialise in ship forgings and machine-gear cutting and the making of wire-rope gear connections.

REVISED ARTICLES OF ASSOCIATION are to be submitted to a meeting of shareholders of Messrs. Edgar Allen & Company, Limited, Sheffield, on June 25. The existing articles were framed thirty years ago, and, a circular to the shareholders points out, contain provisions now no longer applicable while not including others now customary. It is desired also, by altering the memorandum of association, to give the company powers to assist concerns or to promote any company, where it is likely to be beneficial to the company itself.

THE NORTH OF ENGLAND SHIPOWNERS' ASSOCIATION, at a special meeting in Newcastle on June 9, passed a resolution declaring that the association, having in mind the unfortunate results of State assistance towards the building of ships, of which the operation of the Trade Facilities Act and similar measures form a recent example, strongly deprecates the use of British Government funds or credits to assist either the building of new ships or the purchase of second-hand tonnage for any account, irrespective of the status or nationality of the buyer.

A CABLE FROM Bangkok announces that the new memorial bridge, built by Messrs. Dorman, Long & Company, Limited, at a cost of nearly £300,000, was formally handed over on June 4, after all tests had been satisfactorily carried out. Prince Purachatra, Minister of Communications, has cabled his congratulations to the contractors on the successful completion of their work, four months in advance of the stipulated contract time. The bridge, which was built to commemorate the 150th anniversary of the foundation of the city of Bangkok, carries a roadway across the River Chow Phya, in the centre of the city, and has a large central opening span of the bascule type to allow for shipping passing through Bangkok.

FURTHER DEVELOPMENTS are taking place in the shipbuilding industry with regard to the closing of yards which, owing to the present state of trade, are regarded as redundant. Negotiations have been concluded for the acquisition by National Shipbuilders Security, Limited, of the Hebburn Shipyard, owned by Messrs. Renwick & Dalgliesh. This yard was laid down about two years after the termination of the war, and was equipped for a large output, but by 1922 the depression in industry had become so acute that no vessels have been built there, and in recent years efforts have been made to dispose of the undertaking. Negotiations with respect to other North-East Coast yards are going on.

AT THE ANNUAL MEETING of the Association of the Czecho-Slovak Metal Working Industry, held in Prague recently, it was stated that the depression which had prevailed in the industry since the middle of 1929, although developing more slowly than in other branches, had in the course of 1930 grown to a crisis which found expression in the drop in employment. In the course of the past year, according to returns from 180 firms owning 203 concerns, the number of workers had declined from 123,165 to 102,269, and the average working hours per week from 47.01 to 43.3. There was thus a decline of over 23 per cent. in the total number of hours worked per week. The current year had so far brought no improvement, nor was any speedy and substantial betterment to be expected in the near future.

A MEETING OF the 6 per cent. debenture holders of the Darlington Forge, Limited, was held at Darlington to consider a scheme of arrangement regarding the payment of interest. The scheme submitted was similar to one previously proposed by the company, except that it did not embody the cancellation of interest not paid to debenture holders during the moratorium period, but preserved the full rights of debenture holders to payment of any arrears of interest out of future profits of the company before any dividend was paid to preference or ordinary shareholders. It also provided for simple interest at a rate of 5 per cent. per annum being paid on any arrears of interest that may not have been paid by September 30, 1936. A resolution embodying the scheme of arrangement was carried unanimously.

THE ENGINEERING AND ALLIED EMPLOYERS' NATIONAL FEDERATION have intimated to the negotiating committee of the engineering trade unions that their modified proposals will be put into operation by federated firms throughout the country on July 6 whether the unions agree or not. The proposals which the employers have decided to enforce include a readjustment of the rates and the periods for overtime on day shift, night shift and the two- and three-shift systems. The employers have adhered to their original demand that piecework prices and bonus or basis times for payment by results shall be reduced to 25 per cent. over the ordinary time rates, excluding war bonus. They have, however, agreed to maintain the 47-hour week. In the meantime the situation, as far as the unions are concerned, remains undecided.

Company Meeting.

Barrow Hematite Steel Company, Limited.—The annual meeting of the Barrow Hematite Steel Company, Limited, was held in London on June 10. The HON. ROBERT JAMES (the chairman), in moving the adoption of the report and accounts, said that during the year the company presented a scheme of arrangement for the consideration of all parties concerned. Efforts to raise the £150,000 of prior lien bonds essential to carry out the scheme had not, up to the present, succeeded. Early in the current year orders for rails were secured, and the furnaces and steelworks were started about the third week in January. They remained in continuous operation to the end of May, and during that time the company had earned profits. Various schools of thought attributed the existing world trade depression to various causes. So far as this country was concerned, there were, to his mind, two main causes :—(1) Our own fiscal and currency policies, and (2) international causes. Industry in this country had not had a fair deal since the war. Through deflation of our currency industry had been sacrificed to the financial community. Through free trade the markets of this country were thrown open to those who had not contributed one penny to our taxes. In financial circles it was usually stated that the cause of to-day's world depression was over-production. He disagreed with that view. The real cause was under-consumption, due to the persistent appreciation of gold and the breakdown of the world's financial and monetary machinery. Although there might, in certain instances (for example, wheat), be over-production, as regarded the great bulk of commodities there was no over-production, because it was well-known that nobody was consuming what he would like to consume—although his willingness to produce remained unimpaired. The individual was not consuming because he had not the means to consume, and, as he was willing to produce, the failure must, therefore, be on the financial side. During the last 50 years the world had made enormous progress in the realms of science, engineering and machinery. The one section of the business community which had made least progress was the financial section. We were tied back on to antiquated means of finance which he believed were proving themselves wholly inadequate for the requirements of the world to-day. Some means of exchange would have to be discovered which was elastic and which, instead of being based on a valueless metal, would be based on the real wealth of the world. It seemed particularly regrettable that the fate of the world to-day was determined by that section of society which not only performed the smallest real function, but had made the least progress during the centuries.

Contracts Open.

Istanboul, June 28.—48,280 kilogrammes of tool steel, for the Direction-General of Military Factories. The Department of Overseas Trade. (Reference G.X. 10,478.)

Johannesburg, July 20.—Charcoal iron, steel and brass boiler tubes, for the South African Railways and Harbours. The Department of Overseas Trade. (Reference G.X. 10,492.)

Newcastle Emlyn, June 25.—Cast-iron and bitumen-lined steel pipes, with valves and other fittings, together with the construction of four service reservoirs, collecting chambers, etc., for the Rural District Council. Mr. R. Rees, clerk, Newcastle Emlyn. (Fee £3 3s., returnable.)

New Companies.

J. S. Naylor's Son, Limited, 71, Hanover Street, Keighley.—Capital £2,000. Brass founders, etc. Director: W. Naylor.

Heenan & Spencer, Limited, 71, Lincoln's Inn Fields, London, W.C.—Capital £11,000. Steam-heating engineers, boiler makers, etc.

John H. Pye, Limited, Britannia Works, Moreton-in-Marsh.—Capital £6,000. Metal window manufacturers, etc. Directors: J. H. and T. H. Pye.

Personal.

MR. F. THEAKSTON has been elected a director of Messrs. Robert Hudson, Limited, Leeds, and has taken charge of the firm's London branch.

Will.

STUBBS, MAJOR THOMAS D. H., Nunthorpe, secretary of Dorman, Long & Company, Limited, Middlesbrough ... £13,098

Anglo-Russian Trade.

The Russo-British Chamber of Commerce held their first annual dinner at the Hotel Victoria on Tuesday last, Mr. L. E. Mather (chairman of Messrs. Mather & Platt, Limited), President of the Chamber, in the chair. Mr. G. Sokolnikoff (Soviet Ambassador) and Mr. S. G. Bron (Trade Commissioner for the U.S.S.R.) were present. In the course of some remarks on the development of trade between the two countries, he said that some of the prices quoted by British firms had shown a complete disregard of the competition of other countries. In many instances the prices which had been asked by British manufacturers had been out of all proportion to actual conditions and entirely unaccountable. It was, indeed, only too frequently that high prices and unfavourable credit terms militated against British concerns.

Amongst the firms possessing foundries or associated with the foundry industry represented at the dinner were: Belliss & Morcom, Limited; Metropolitan-Vickers Electrical Company, Limited; Babcock & Wilcox, Limited; Alfred Herbert, Limited; Colvilles, Limited; Stewarts & Lloyds, Limited; Beyer, Peacock & Company, Limited; Agricultural & General Engineers, Limited; Lancashire Steel Corporation; Hailwood & Ackroyd, Limited; R. A. Lister & Company, Limited; H. R. Brassert & Company, Limited; Robey & Company, Limited; Marshall, Sons & Company, Limited; Birmingham Small Arms, Limited; Hadfields, Limited; Tweedale & Smalley, Limited; August's Muffle Furnaces, Limited; Markham & Company, Limited; Meltham Silica Brick Company, Limited; Broom & Wade, Limited; Coleman Foundry Equipment Company, Limited; John A. Smeeton, Limited.

Iron and Steel Markets.

Pig-Iron.

MIDDLESBROUGH.—No further development of any importance has occurred in this market during the past week, prices being maintained in face of keen competition. Twenty-two blast furnaces are still in operation, and the average output per furnace is greater than ever before. Buyers in Scotland are offered special terms, but pig-iron from the Continent is being dumped into Scotland at prices well below even the special rates quoted from Cleveland. Thus, it is only where consumers are prepared to pay a higher figure for the Cleveland product that the latter can find an outlet. A little Midlands iron is still coming into the Cleveland district, but no fresh sales of foreign iron are reported here, and makers are content to carry on with prices unchanged. Thus, for all destinations except Scotland, the fixed quotations are:—No. 1 Cleveland foundry iron, 61s. per ton; No. 3 Cleveland G.M.B., 58s. 6d.; No. 4 foundry, 57s. 6d.; No. 4 forge iron, 57s. per ton, f.o.t. or f.o.b.

In the hematite market the present low prices are attracting a fairly steady flow of home orders, while further sales of East Coast hematite to Denmark and Italy are reported. In the home market prices are uncontrolled, and have become a matter of bargaining between consumer and producer. For small prompt lots of mixed numbers, 64s. is still regarded as an average figure, but lower terms would certainly be accepted for an order for a few hundred tons, such orders, as a matter of fact, being rather scarce. No. 1 quality is at a premium of 6d. per ton, making the nominal quotation 64s. 6d. Bessemer mixed numbers on the North-West Coast are quoted at 66s.

LANCASHIRE.—Consumers are content to place orders for immediate delivery. Cheap machinery scrap is now as much as 30s. per ton below the price of delivered foundry iron, and therefore it is being freely bought by the foundries in place of iron. For delivery to consumers in the Manchester zone, Derbyshire and Staffordshire descriptions of No. 3 are quoted at 67s. per ton, with North-East Coast iron also at 67s. The price of Northamptonshire foundry is 65s. 6d. and Derbyshire forge 62s. Scottish foundry brands are at about 88s., with West Coast hematite iron at 80s. 6d.

MIDLANDS.—No change is observable in this market. Consumers are still strictly confining their orders to small parcels for current consumption. For delivery to Birmingham and Black Country stations the furnaces still quote 62s. 6d. for Northants No. 3 and 66s. for Derbyshire, North Staffordshire and Lincolnshire No. 3.

SCOTLAND.—No improvement in business has resulted from the recent reduction in prices from the very high level at which they stood so long. A little business has been done in foreign iron. The Scottish pig-iron makers are quoting as a fixed minimum price 71s. per ton for No. 3 foundry, f.o.t. furnaces, with a minimum of 2s. 6d. per ton extra for No. 1. The price of Continental No. 3 is 52s., f.o.t. Grangemouth. Middlesbrough No. 3 is at 59s. 6d.

Finished Iron.

This market is rather neglected. Orders are meagre and insufficient to enable the ironworks to keep their mills working regularly. Some are working two or three days a week; others are idle one week and working the next. Crown and the cheaper grades of iron are in the worst position, although the makers of marked bars could do with considerably more business, as they are anything but busy. Marked bars are unchanged at £12, at works. Prices of crown bars vary according to the producing district, and rates are at anything from £9 15s. upwards. Nut and bolt iron is offered at about £8 12s. 6d., but only spasmodic orders are available, as the bulk of this class of iron for common work is obtained from foreign sources. The present price for No. 3 Belgian material is £4 12s. 6d. to £4 15s. per ton delivered Black Country consumers' works.

Steel.

Little satisfaction can be derived from the condition of this market. The finished-steel works are still badly in need of orders. Few specifications of any bulk are forthcoming, and rolling programmes have to be made up from small quantities accumulated from whatever quarter possible. Prices of Continental finished steel have had a sharp fall, and, despite the rebate scheme for steel plates and sections, the home producers are cautiously watching the situation on account of its depressing effect on the level of prices generally. The small steel bar market is still very weak. A further reduction of prices has been made by re-rollers in this country, although the steelworks are maintaining their prices. Continental prices of steel bars have fallen by 4s. on the week. The sheet market remains very quiet. The home market for semi-finished steel is also very quiet. No fresh business has been produced by the recent lower prices, owing to the fact that the fall in Continental prices has been much greater. There seems to be no bottom to the Continental market. Sheet bars this week have been sold at 63s. f.o.b. Antwerp and billets at 60s. Some Continental makers are said to have sold even at below these figures, although not to consumers in this country.

Scrap.

In the Cleveland market the slight activity of last week is maintained. Ordinary-quality cast-iron scrap is now down to 42s. 6d., with good machinery quality at 44s. In the Midlands the market is even more depressed than before. Business is only attracted by very low prices. Good heavy machinery cast-iron scrap in cupola sizes is offered at 47s. 6d., with light cast iron at 35s. to 37s. 6d. The position on the Scottish market is also bad. Prices generally have fallen, without producing any outlet for a reasonable quantity of any class of scrap. First-class machinery metal, in pieces not exceeding 1 cwt., is quoted at 47s. 6d. to 50s., while ordinary cast-iron scrap to the same specification is at 43s. 6d. to 45s. The above prices are all delivered consumers' works.

Metals.

Copper.—The American copper statistics for May did not make very pleasant reading. The most pessimistic forecasts were justified by the increase of 31,000 short tons in the refined stocks. The deliveries to domestic and overseas buyers decreased appreciably, and, surprisingly enough, the increase in the output of refined metal was much above the monthly average of 101,200 tons during the four months from January to April. The one and only point from which consolation can be drawn is the small decrease in the stocks of blister copper, but that is a mere drop in the ocean. Perturbation has been caused by the decrease in the deliveries to domestic consumers in the United States to slightly over 45,000 tons, which seems to indicate that American consumption, so far from improving, is still actually deteriorating.

Closing quotations :—

Cash.—Thursday, £36 3s. 9d. to £36 6s. 3d.; Friday, £35 3s. 9d. to £35 6s. 3d.; Monday, £34 10s. to £34 11s. 3d.; Tuesday, £34 7s. 6d. to £34 8s. 9d.; Wednesday, £34 6s. 3d. to £34 8s. 9d.

Three Months.—Thursday, £36 17s. 6d. to £37; Friday, £35 17s. 6d. to £36; Monday, £35 5s. to £35 6s. 3d.; Tuesday, £35 to £35 2s. 6d.; Wednesday, £35 to £35 2s. 6d.

Tin.—The outlook of this market is not yet particularly bright. There is, however, the probability that a reduction in the supplies of metal coming on the market will improve the situation. The effects of the quota scheme have so far not been apparent, but they should be reflected in the market before long. Moreover, there are further rumours of the impending formation of an international pool which will carry the bulk of the stocks, and this has given a certain amount of support to the market.

Official closing prices :—

Cash.—Thursday, £105 7s. 6d. to £105 10s.; Friday, £104 10s. to £104 12s. 6d.; Monday, £102 7s. 6d. to £102 10s.; Tuesday, £101 15s. to £102; Wednesday, £101 2s. 6d. to £101 5s.

Three Months.—Thursday, £106 17s. 6d. to £107; Friday, £106 to £106 2s. 6d.; Monday, £104 to £104 2s. 6d.; Tuesday, £103 7s. 6d. to £103 10s.; Wednesday, £102 17s. 6d. to £103.

Spelter.—Further discussion concerning the formation of a zinc cartel, combined with the low price and the generally more buoyant tone all round, gave the market a more cheerful appearance during the past week. On Friday the various representatives of the European zinc producers met in an international conference at Brussels for the purpose of endeavouring to bring about an all-round 50 per cent. reduction in the total production, the proposed understanding to be of 12 months' duration. It is expected that a conference with overseas producers will be held in Brussels in July with a view to their admission to the syndicate.

Daily fluctuations :—

Ordinary.—Thursday, £11 6s. 3d.; Friday, £10 15s.; Monday, £10 17s. 6d.; Tuesday, £11; Wednesday, £11 2s. 6d.

Lead.—The slight improvement of last week has not been maintained. Prices reacted in sympathy with the easier tone of other metals.

The week's prices have been :—

Soft Foreign (Prompt).—Thursday, £11 6s. 3d.; Friday, £11 1s. 3d.; Monday, £11 1s. 3d.; Tuesday, £11 5s.; Wednesday, £11 6s. 3d.

Production of Iron Sponge in Germany.—Fried. Krupp and Vereinigte Stahlwerke A.G. some time ago formed a company under the title of Eisenschwammgesellschaft (Iron Sponge Company) at Bochum for the purpose of producing iron sponge by the Norsk-Staal process. The plant specially installed for this purpose worked quite satisfactorily during the first few months of the current year, but for financial reasons its working has been temporarily suspended, until the situation improves.

CAST IRON FLANGED PIPES
2 in.—12 in. & CONNECTIONS. to 24 in. dia.
WE HAVE FIFTY-TWO YEARS OF ACCUMULATED EXPERIENCE AND METAL PATTERNS.
JAMES & RONALD RITCHIE, LTD.,
Telephone: 3852 (2 Lines). MIDDLESBROUGH. Telegrams: "Ritchie, Middlesbrough."

Special CARBON BLACKING

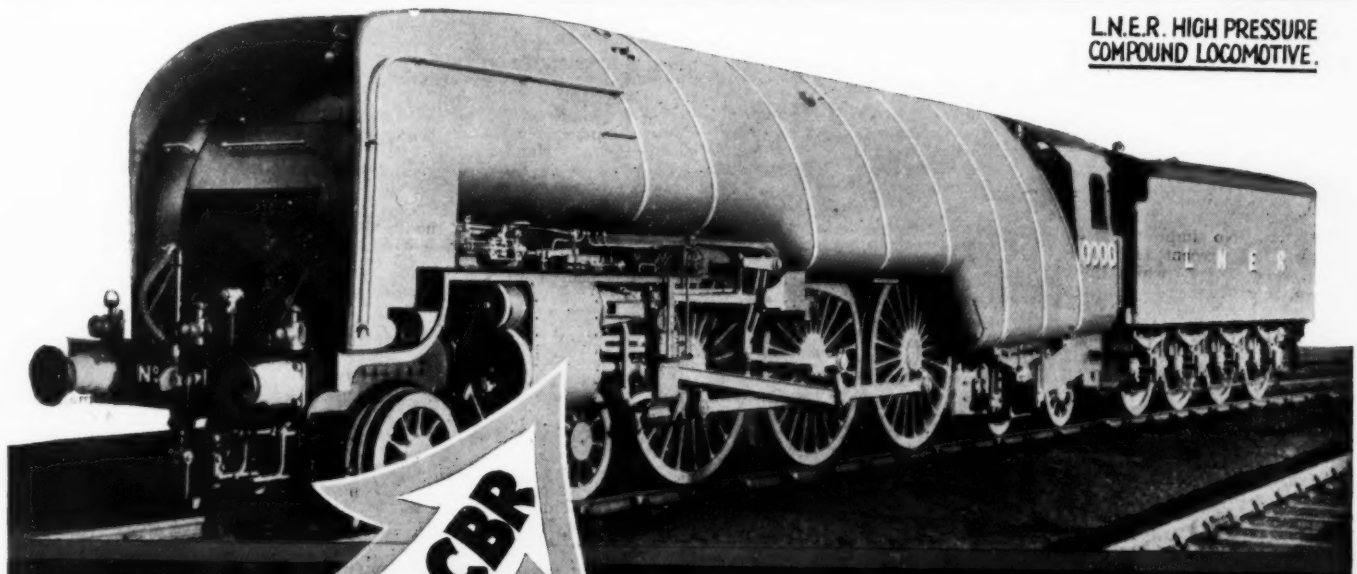
67 MADE BY A FIRM WITH YEARS EXPERIENCE.

JAS. DURRANS & SONS, LIMITED.
PHŒNIX WORKS
PENISTONE, NR. SHEFFIELD.

Also—
GANISTER,
LOAM AND SAND MILLS.
STUDS,
CHAPLETS,
BRUSHES,
CORE ROPES,
BUCKETS,
SPADES, ETC.
LADLES,
FIRE BRICKS,
STONE FLUX,
CASTING CLEANERS,
PIPE NAILS,
SPRIGS,
WIRE BRUSHES,
BELLOWS.

PLUMBAGO
CORE GUM
WHITE DUST
COAL DUST
REQUISITES

L.N.E.R. HIGH PRESSURE COMPOUND LOCOMOTIVE.



WARNER CBR

WARNER CBR
CYLINDER PIG IRON.
SPECIFIED BY THE L.N.E.R. FOR THE CAST IRON LOW PRESSURE CYLINDERS OF THE ABOVE LOCOMOTIVE. THEIR COMPLETE CONFIDENCE IS THE RESULT OF LONG EXPERIENCE WITH WARNER CBR IN ALL THEIR LOCOMOTIVE CYLINDERS.
WARNER & CO. LTD., CARGO FLEET, MIDDLESBROUGH ON TEES.
TELEPHONE :—MIDDLESBROUGH 4265
TELEGRAMS :—REFINERY, MIDDLESBROUGH

WEEKLY PRICE CURRENT.

COPPER.

	£ s. d.
Standard cash	34 6 3
Three months	35 0 0
Electrolytic	37 10 0
Tough	35 0 0
Best selected	35 10 0
Sheets	70 0 0
India	50 0 0
Wire bars	39 7 6
Do., July	39 7 6
Do., August	39 7 6
Ingot bars	39 7 6
H.C. wire rods	40 10 0
Off. av. cash, May	38 18 10½
Do., 3 mths., May	39 11 10⅝
Do., Sttlmnt., May	38 18 10½
Do., Electro, May	42 13 1½
Do., B.S., May	40 16 4½
Do., wire bars, May	43 2 9
Solid drawn tubes	10½d.
Brazed tubes	10½d.
Wire	6¾d.

BRASS.

Solid drawn tubes	9¼d.
Brazed tubes	11½d.
Rods, drawn	8¾d.
Rods, extd. or rlld.	5d.
Sheets to 10 w.g.	7¼d.
Wire	7¾d.
Rolled metal	7½d.
Yellow metal rods	5d.
Do. 4 × 4 Squares	5½d.
Do. 4 × 3 Sheets	5½d.

TIN

	£ s. d.
Standard cash	101 2 6
Three months	102 17 6
English	102 10 0
Bars	105 0 0
Straits	103 10 0
Australian	102 15 0
Eastern	105 10 0
Banca	105 5 0
Off. av. cash, May	104 8 0
Do., 3 mths., May	105 14 10½
Do., Sttlmt., May	104 8 0

SPELTER.

	£ s. d.
Ordinary	11 2 6
Remelted	9 17 6
Hard	7 17 6
Electro 99.9	13 5 0
English	11 10 0
India	10 0 0
Zinc dust	19 0 0
Zinc ashes	2 0 0
Off. aver., May	10 13 7½
Aver. spot, May	10 9 8¼

LEAD.

	£ s. d.
Soft foreign ppt.	11 6 3
English	12 15 0
Off. average, May	11 12 8½
Average spot, May	11 9 9¾

ZINC SHEETS, &c.

	£ s. d.
Zinc sheets, English	20 0 0
Do., V.M. ex-whf.	19 0 0
Rods	20 10 0
Boiler plates	13 5 0
Battery plates	15 0 0

ANTIMONY.

	£ s. d.
Special brand, Eng.	34 0 0
Chinese	22 10 0
Crude	19 0 0

QUICKSILVER.

	£ s. d.
Quicksilver	16 15 0

FERRO-ALLOYS AND STEEL-MAKING METALS.

Ferro-silicon—	
25%	£7 7 6
45/50%	£10 10 0
75%	£15 2 6
Ferro-vanadium—	
35/50%	12/8 lb. Va.
Ferro-molybdenum—	
70/75% c. free	4/2 lb. Mo.
Ferro-titanium—	
23/25% carbon-free	9½d. lb.
Ferro-phosphorus, 20/25%	£15 10 0
Ferro-tungsten—	
80/85%	1/8½ lb.
Tungsten metal powder—	
98/99%	1/11½ lb.
Ferro-chrome—	
2/4% car.	£29 0 0
4/6% car.	£21 5 0
6/8% car.	£20 12 6
8/10% car.	£19 17 6
Ferro-chrome—	
Max. 2% car.	£29 17 6
Max. 1% car.	£33 15 0
Max. 0·70% car.	£35 12 6
70% carbon-free	9½d. lb.
Nickel—99%	£170 0 0 to £175 0 0
Ferro-cobalt	9/– lb.
Aluminium 98/99%	£85 0 0
Metallic chromium—	
96/98%	2/7 lb.
Ferro-manganese (net)—	
76/80% loose	£10 15 0 to £11 5 0
76/80% packed	£11 15 0 to £12 5 0
76/80% export	(nom.) £ 9 0 0
Metallic manganese—	
94/96% carbonless	1/3 lb.

Per ton unless otherwise stated.

HIGH-SPEED TOOL STEEL.

Finished bars, 14% tungsten	£0 2 0
Finished bars, 18% tungsten	£0 2 9

Per lb. net, d/d buyers' works.

Extras—

Rounds and squares, 3 in. and over	4d. lb.
Rounds and squares, under ½ in. to ¼ in.	3d. lb.
Do., under ¼ in. to 7/16 in.	1/– lb.
Flats, ½ in. × ¼ in. to under 1 in. × ⅛ in.	3d. lb.
Do., under ½ in. × ¼ in.	1/– lb.
Bevels of approved sizes and sections	6d. lb.

Bars cut to length, 10% extra.

SCRAP.

	£ s. d.	£ s. d.
South Wales		
Heavy steel		2 2 6
Bundled steel and shrngs.	1 15 0 to	1 19 0
Mixed iron and steel		1 17 6
Heavy cast iron		2 5 0
Good machinery for foundries		2 8 0
Cleveland—		
Heavy steel		1 17 6
Steel turnings		1 5 0
Cast-iron borings		1 2 0
Heavy forge		2 13 0
W.I. piling scrap		2 10 0
Cast-iron scrap	2 2 6 to	2 4 0
Midlands—		
Light cast-iron scrap		1 15 0
Heavy wrought		2 7 6
Steel turnings		—
Scotland—		
Heavy steel		1 17 6
Ordinary cast iron		2 4 0
Engineers' turnings		1 6 0
Cast-iron borings		1 10 0
Wrought-iron piling		2 10 0
Heavy machinery		2 8 0

London—Merchants' buying prices delivered yard.

Copper (clean)	26 0 0
Brass	18 0 0
Lead (less usual draft)	8 5 0
Tea lead	5 5 0
Zinc	3 15 0
New aluminium cuttings	46 0 0
Braziery copper	23 0 0
Gunmetal	24 0 0
Hollow pewter	68 0 0
Shaped black pewter	43 0 0

PIG-IRON.

(f.o.t. unless otherwise stated.)

N.E. Coast—	
Foundry No. 1	61/–
Foundry No. 3	58/6
Foundry No. 4	57/6
Forge No. 4	57/–
Hematite No. 1	64/6
Hematite M/Nos.	64/–
N.W. Coast—	
Hem. M/Nos. d/d Glas.	73/6
„ d/d Birm.	84/6
Malleable iron d/d Birm.	115/–
Midlands—	
Staffs common*	—
„ No. 4 forge*	61/–
„ No. 3 fdry.*	66/–
Shrops basic	—
„ Cold blast, ord.	—
„ „ roll iron	—
Northants forge*	57/6
„ fdry. No. 3*	62/6
„ fdry. No. 1*	65/6
Derbyshire forge*	61/–
„ fdry. No. 3*	66/–
„ fdry. No. 1*	69/–
„ basic*	—

*d/d Black Country dist.

Scotland—	
Foundry No. 1	73/6
„ No. 3	71/–
Hem. M/Nos. d/d	70/–
Sheffield (d/d district)—	
Derby forge	58/6
„ fdry. No. 3	63/6
Lincs forge	—
„ fdry. No. 3	63/6
E.C. hematite	78/6
W.C. hematite	82/6
Lancashire (d/d eq. Man.)—	
Derby forge	62/–
„ fdry. No. 3	67/–
Staffs fdry. No. 3	67/–
Northants fdry. No. 3	65/6
Cleveland fdry. No. 3	67/–
Dalzell, No. 3 (special)	105/– to 107/6
Summerlee, No. 3	88/–
Eglinton, No. 3	88/–
Gartsherrie, No. 3	88/–
Monkland, No. 3	88/–
Shotts, No. 3	88/–

FINISHED IRON AND STEEL.

Usual District deliveries for iron; delivered consumers' station for steel.

	£ s. d.	£ s. d.
Iron—		
Bars (cr.)	9 15 0 to	10 10 0
Nut and bolt iron		8 12 6
Hoops	10 10 0 to	12 0 0
Marked bars (Staffs) f.o.t.		12 0 0
Gas strip	10 10 0 to	12 0 0
Bolts and nuts, ½ in. × 4 in.		12 5 0
Steel—		
Plates, ship, etc.	8 15 0 to	8 17 6
Boiler plts.	8 17 6 to	9 12 6
Chequer plts.		10 7 6
Angles		8 7 6
Tees		9 7 6
Joists		8 15 0
Rounds and squares, 3 in. to 5½ in.		9 7 6
Rounds under 3 in. to ⅜ in. (Untested)		6 12 6
Flats—8 in. wide and over		8 12 6
„ under 8 in. and over 5 in.		8 17 6
Rails, heavy	8 5 0 to	8 10 0
Fishplates		12 0 0
Hoops (Staffs)		9 5 0
Black sheets, 24g.	8 5 0 to	9 5 0
Galv. cor. shts. 24g.		10 0 0
Galv. flat sheets		10 10 0
Galv. fencing wire, 8g. plain		12 0 0
Billets, soft	5 0 0 to	5 7 6
Billets, hard	6 12 6 & up.	
Sheet bars	4 12 6 to	5 2 6
Tin bars		4 12 6

PHOSPHOR BRONZE.

	Per lb. basis.
Strip	11¼d.
Sheet to 10 w.g.	11½d.
Wire	1/–
Rods	11¼d.
Tubes	1/4½d.
Castings	11¾d.

Delivery 3 cwt. free.
10% phos. cop. £30 above B.S.
15% phos. cop. £35 above B.S.
Phosphor tin (5%) £30 above price of English ingots.
C. Clifford & Son, Limited.

NICKEL SILVER, &c.

	Per lb.
Ingots for raising	7d. to 1/1
Rolled—	
To 9 in. wide	1/1 to 1/7
To 12 in. wide	1/1½ to 1/7½
To 15 in. wide	1/1½ to 1/7½
To 18 in. wide	1/2 to 1/8
To 21 in. wide	1/2½ to 1/8½
To 25 in. wide	1/3 to 1/9
Ingots for spoons and forks	7d. to 1/3½
Ingots rolled to spoon size	10d. to 1/6½
Wire round—	
3/– to 10 g.	1/4½ to 1/11½

with extras according to gauge.

Special 5ths quality turning rods in straight lengths, 1/3½ upwards.

AMERICAN IRON AND STEEL.

At Pittsburgh unless otherwise stated.

	Dols.
No. 2 foundry, Phila.	17.26
No. 2 foundry, Valley	17.00
No. 2 foundry, Birm.	12.00
Basic	17.26
Bessemer	18.76
Malleable	18.76
Grey forge	18.26
Ferro-mang. 80%	85.00
O.-h. rails, h'y, at mill	43.00
Billets	29.00
Sheet bars	29.00
Wire rods	35.00
	Cents.
Iron bars, Phila.	2.09
Steel bars	1.65
Tank plates	1.65
Beams, etc.	1.65
Skelp, grooved steel	1.65
Skelp, sheared steel	1.65
Steel hoops	1.85
Sheets, black, No. 24	2.15
Sheets, galv., No. 24	2.80
Sheets, blue an'l'd, No. 13	2.00
Wire nails	1.80
Plain wire	2.20
Barbed wire, galv.	2.55
Tinplates, 100-lb. box	$5.00

COKE (at ovens).

Welsh foundry	22/6 to 25/–
„ furnace	15/–
Durham and Northumberland—	
„ foundry	13/–
„ furnace	13/–
Midlands, foundry	—
„ furnace	—

TINPLATES.

f.o.b. Bristol Channel ports.

I.C. cokes	20×14 box 14/– to 14/3
„	28×20 „ 28/– to 28/6
„	20×10 „ 20/3 to 20/7½
„	18¾×14 „ 14/9 to 15/–
C.W.	20×14 „ 14/–
„	28×20 „ 27/6
„	20×10 „ 20/–
„	18¾×14 „ 14/9
Terneplates	28×20 31/– per box basis f.o.b.

SWEDISH CHARCOAL IRON & STEEL.

Pig-iron	£6 0 0 to £7 10 0
Bars, hammered, basis	£17 10 0 to £18 10 0
Bars and nail-rods, rolled, basis	£15 17 6 to £16 15 0
Blooms	£10 0 0 to £12 0 0
Keg steel	£32 0 0 to £33 0 0
Faggot steel	£20 0 0 to £24 0 0
Bars and rods dead soft, st'l	£11 0 0 to £14 0 0

All per English ton, f.o.b. Gothenburg

TUBES AND FITTINGS.
Current Discounts.

	Tubes.	*Fittings.*
Gas	62½%	57½%
Water ..	58½%	52½%
Steam ..	55%	47½%

W.I. 12½% extra.

DAILY FLUCTUATIONS.

Standard Copper (cash).

		£	s.	d.		
June	11 ..	36	3	9	inc.	20/–
,,	12 ..	35	3	9	dec.	20/–
,,	15 ..	34	10	0	,,	13/9
,,	16 ..	34	7	6	,,	2/6
,,	17 ..	34	6	3	,,	1/3

Electrolytic Copper.

		£	s.	d.		
June	11 ..	39	0	0	inc.	20/–
,,	12 ..	38	10	0	dec.	10/–
,,	15 ..	38	0	0	,,	10/–
,,	16 ..	38	0	0	No change	
,,	17 ..	37	10	0	dec.	10/–

Standard Tin (cash).

		£	s.	d.		
June	11 ..	105	7	6	inc.	45/–
,,	12 ..	104	10	0	dec.	17/6
,,	15 ..	102	7	6	,,	42/6
,,	16 ..	101	15	0	,,	12/6
,,	17 ..	101	2	6	,,	12/6

Tin (English ingots).

		£	s.	d.		
June	11 ..	106	10	0	inc.	45/–
,,	12 ..	105	10	0	dec.	20/–
,,	15 ..	103	10	0	,,	40/–
,,	16 ..	103	0	0	,,	10/–
,,	17 ..	102	10	0	,,	10/–

Zinc Sheets (English).

		£	s.	d.		
June	11 ..	20	0	0	No change	
,,	12 ..	20	0	0	,,	,,
,,	15 ..	20	0	0	,,	,,
,,	16 ..	20	0	0	,,	,,
,,	17 ..	20	0	0	,,	,,

Spelter (ordinary).

		£	s.	d.		
June	11 ..	11	6	3	inc.	8/9
,,	12 ..	10	15	0	dec.	11/3
,,	15 ..	10	17	6	inc.	2/6
,,	16 ..	11	0	0	,,	2/6
,,	17 ..	11	2	6	,,	2/6

Lead (English).

		£	s.	d.		
June	11 ..	13	0	0	inc.	5/–
,,	12 ..	12	10	0	dec.	10/–
,,	15 ..	12	10	0	No change	
,,	16 ..	12	15	0	inc.	5/–
,,	17 ..	12	15	0	No change	

Imports and Exports of Iron Castings in May and the five months 1931, compared with May and the five months 1930.

	May, 1930.	May, 1931.	Five months, 1930.	Five months, 1931.	May, 1930.	May, 1931.	Five months, 1930.	Five months, 1931.
Imports.	Tons.	Tons.	Tons.	Tons.	£	£	£	£
Pipes and Fittings, Cast	1,641	1,367	10,349	5,486	19,007	18,241	123,494	72,304
Castings, in the Rough, Iron	207	128	1,069	789	4,822	2,882	23,113	16,203
,, ,, ,, Steel	902	587	6,689	2,851	22,908	11,237	156,719	60,812
Hollow-ware, Cast, not Enamelled	5	11	14	28	502	824	1,585	2,033
,, ,, Enamelled	4	3	11	36	201	185	682	1,630
Exports.								
BUILDERS' CASTINGS—								
To Argentine Republic	122	34	913	392	4,266	1,260	36,577	16,724
,, British South Africa	188	224	952	786	8,452	8,315	38,761	31,055
,, ,, India	125	135	713	614	5,123	4,760	26,043	21,166
,, Australia	11	1	211	53	725	39	12,472	2,398
,, New Zealand	96	26	494	214	5,884	1,452	29,541	13,437
Total (including other countries)	1,450	1,030	7,614	5,340	64,605	43,985	337,800	240,420
PIPES AND FITTINGS—CAST—								
To Argentine Republic	1,552	370	6,770	3,088	15,290	3,524	64,578	29,491
,, British South Africa	196	735	3,883	4,309	3,386	8,822	42,846	50,828
,, ,, India	278	127	1,701	780	3,836	1,729	24,778	14,126
,, Straits Settlements and Malay States	99	80	2,319	821	1,459	1,584	23,010	11,135
,, Ceylon	151	181	440	273	1,391	2,545	5,213	4,090
,, Australia	37	1	496	83	909	53	8,663	1,638
Total (including other countries)	9,015	7,426	53,245	32,006	105,519	85,704	588,555	369,093
HOLLOW-WARE—								
Cast, not Enamelled, and Cast, Tinned	350	169	1,849	989	10,540	6,288	58,793	34,360
,, Enamelled	73	30	318	216	6,731	3,458	28,299	22,481
CASTINGS, in the rough—								
Iron	129	215	1,175	763	6,960	4,446	34,136	23,362
Steel	140	24	936	655	7,347	1,149	36,413	21,785

WILLIAM JACKS & COMPANY,
WINCHESTER HOUSE, OLD BROAD ST., LONDON, E.C.2.

18, BENNETTS HILL, BIRMINGHAM.
13, RUMFORD STREET, LIVERPOOL.

PIG

IRON

All grades FOUNDRY, HEMATITE, BASIC, SPECIALS, &c.

NON-FERROUS METALS

COPPER, TIN, LEAD, SPELTER, ANTIMONY, CHROME ORE.

WILLIAM JACKS & COMPANY,
19, ST. VINCENT PLACE, GLASGOW.
ZETLAND ROAD, MIDDLESBROUGH.

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(A remittance should accompany instructions.)

SITUATIONS WANTED.

EXPERIENCED Foundry Trade Traveller desires position as Representative for Lancashire or the Midlands. Thoroughly practical and well known; extensive experience in refractories and moulding machines; member I.B.F.—Box 810, Offices of THE FOUNDRY TRADE JOURNAL, 49, Wellington Street, Strand, London, W.C.2.

FOUNDRY Manager or Foreman disengaged: 5 years American experience, 2 years Foreman; iron and brass; wide experience all branches foundry practice; technical training; excellent references.—Box 812, Offices of THE FOUNDRY TRADE JOURNAL, 49, Wellington Street, Strand, London, W.C.2.

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Any Member, Associate Member or Associate of the Institute of British Foundrymen who desires his qualifications to be inserted in the column must forward to the General Secretary of the Institute the following information:—(a) Name and address; (b) name of present employer (or last employer if unemployed); (c) brief particulars of qualifications, experience, and type of position required. The name will not be disclosed until the candidate is in communication with a prospective employer. Announcements will be inserted in two successive issues, unless announcers' requirements have been met with in the meantime.

Any employer wishing to communicate with a candidate should write to the General Secretary, quoting identification number.

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MOULDER, with first-class experience on high-grade castings for turbine Diesel work, also general engineering, desires position as foreman or other supervisory position with prospects. (119)

PROGRESSIVE Position required in Roll or engineering foundry. Sound experience in chilled and grain rolls, including metal mixtures, alsd general engineering castings. (120)

FOUNDRY Manager desires re-engagement. Expert knowledge patternmaking, machine and plate moulding, and general jobbing work, also baths. Excellent references. (121)

POSITION required as Commercial Assistant or Representative. Foundry and machine-moulding knowledge, experience marine turbines and oil-burning installations. Storekeeping. (122)

POSITION required as Foreman or Foundry Manager; wide experience in steam, engine, textile, and general engineering castings. Technically trained. (123)

METALLURGIST and Chief Chemist requires position. Blast-furnace and foundry experience. Honours Medallist, City and Guilds. Research Medallist, S.I. & S.I. (124)

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REPRESENTATIVES having live connections with all kinds of foundries throughout Great Britain and Ireland are invited to make application for an additional Representation on good commission basis. The product is a nationally-advertised one of high repute and in growing demand.—Write, Box 814, Offices of THE FOUNDRY TRADE JOURNAL, 49, Wellington Street, Strand, London, W.C.2.

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MAGNIFICENT

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SHEFFIELD.

145,000 Sq. Ft. of Shops.

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with L.M. & S. and L. & N.E. Rlys.

WELL-BUILT & COMMODIOUS OFFICES

Will Sell whole or in lots to suit customers or Let on favourable terms. Unique opportunity for Manufacturers.

Apply—

THOS. W. WARD, LTD.,
ALBION WORKS, SHEFFIELD.

MACHINERY.

URGENTLY required, two secondhand Cupolas in first-class condition: one 3½ tons capacity, 32 in. inside lining, 30/35 ft. high, one 6 tons capacity, 32 in. inside lining, 30/35 ft. high, height to charging door not more than 20 ft.—Apply, Box 816, Offices of THE FOUNDRY TRADE JOURNAL, 49, Wellington Street, Strand, London, W.C.2.

UNIVERSAL Mixers for Sand Colours, Chemicals, Blacklead, etc., different sizes. Also Super Abrasive Grinders and Steel Attrition Grinder and Dresser. Grind to any degree of fineness.—BOOTH & SON, Grinding, Crushing and Mixing Engineers, Congleton, Cheshire.

ONE No. 2 Cupola complete with Fan, melting capacity 20 cwts. per hr., also one pair Platform Scales, weigh up to 20 cwts., all in perfect condition. Cheap for quick sale.—HARRIS & TAYLOR, Howard Street, Glossop.

SAND MIXERS.—New and Secondhand. Ask us to quote.—W. BREALEY & COMPANY, LIMITED, Station Works, Ecclesfield, Sheffield.

THOS. W. WARD, LTD.

Several No. 4 HERBERT Capstans, s.p.d., for chuck work.
No. 62 FELLOWS Gear-Shaping Machine.
No. 60 HEALD INTERNAL GRINDER.
Several Vertical Milling Machines.
4- and 6-wheel Standard-Gauge STEAM LOCOMOTIVES, cylinders 10 in. to 16 in. dia., 160 lbs. w.p., all about 1921 make. For Sale or Hire.
Three LANCASHIRE BOILERS, 30 ft. 0 in. x 8 ft. 0 in.; re-insure 140 lbs. pressure.
VERTICAL COCHRAN BOILER, 14 ft. 9½ in. x 7 ft. 0 in., working steam pressure 100 lbs. per sq. in.
New "POPULAR JUNIOR" BOILER, 5 ft. 6 in. high x 2 ft. 6 in. dia.; 100 lbs. pressure.

(ASK FOR "ALBION" MACHINERY CATALOGUE.)

ALBION WORKS, SHEFFIELD.

MISCELLANEOUS.

GANISTER, best quality for cupolas, also for Steel Works.—ASTBURY SILICA COMPANY, "The Brooms," Park Lane, Congleton.

WANTED, regular supply of Horse Nails for steel-foundry use.—Box 818, Offices of THE FOUNDRY TRADE JOURNAL, 49, Wellington Street, Strand, London, W.C.2.

MISCELLANEOUS—*Continued.*

'Phone: 287 SLOUGH

SAND PLANT

IN STOCK

Small Jackman SM4 Aerator...	£12
Halls "Invincible" mixer ...	£18
"Herbert" mixer, as new ...	£32
All above BALL BEARING.	
5 ft. Universal Sandmill... ...	£26
6 ft. "Jackman" sandmill ...	£38
Pneulec Oils and Mixer, type PM	£14
"Macdonald" air riddle as new	£10

ALEX. HAMMOND, *Foundry Machinery Merchant,*
14, AUSTRALIA ROAD, SLOUGH

Bradley's

MIXTURE SERVICE

The Bradley Mixture Service is designed to enable the full benefit of Refined Irons, their unique properties, uniformity of quality and composition, to be available to the general foundry public.

The service is based upon a standard series of Refined Irons of guaranteed composition of which a stock is held continuously available at twenty-four hours' notice.

Full particulars of the Bradley Mixture Service are contained in an interesting booklet, a copy of which will be sent free on request.

BRADLEY & FOSTER LIMITED
IRONMASTERS
DARLASTON, STAFFS

Telegrams: "Bradley, Darlaston." Telephone: Darlaston 16 (P.B. Ex.)

PETER—WITH ONE EXCEPTION

With one exception Peter is an ordinary little fellow. Chubby, likeable, just five-and-a-half, full of life and fun, and on occasions—be it admitted—of naughtiness. Just now Peter's rather important, for this is his first term at school, and he's grappling with the intricacies of "A B C" and "Twice-Two": difficult subjects to all men of five-and-a-half, but even more difficult in Peter's case because—bad luck—he's totally blind. That's his one Exception. Peter learns reading, writing, and 'rithmetic through the medium of "Braille"—dull stuff compared with the coloured picture books of most five-and-a-halfs. However, he's a stout lad is Peter, and he's making great progress.

Would you like to know more about him? How, in spite of his "One Exception," he is being educated and, when older, technically trained and usefully employed.

There is a long waiting list of "Peters" throughout the British Isles, for whom training and accommodation must be provided in the immediate future.

Will you help with a donation or annual subscription? Any sum, large or small, will be gratefully received.

Here's a suggestion. Your eyesight is worth 3d. a year to you. Send Peter and his handicapped pals 3d. for every year you've had it. Now, please, in case it slips your memory. Good idea?

The Chairman,

SCHOOL FOR THE BLIND
(FOUNDED 1838)
SWISS COTTAGE, LONDON, N.W. 3

XUM